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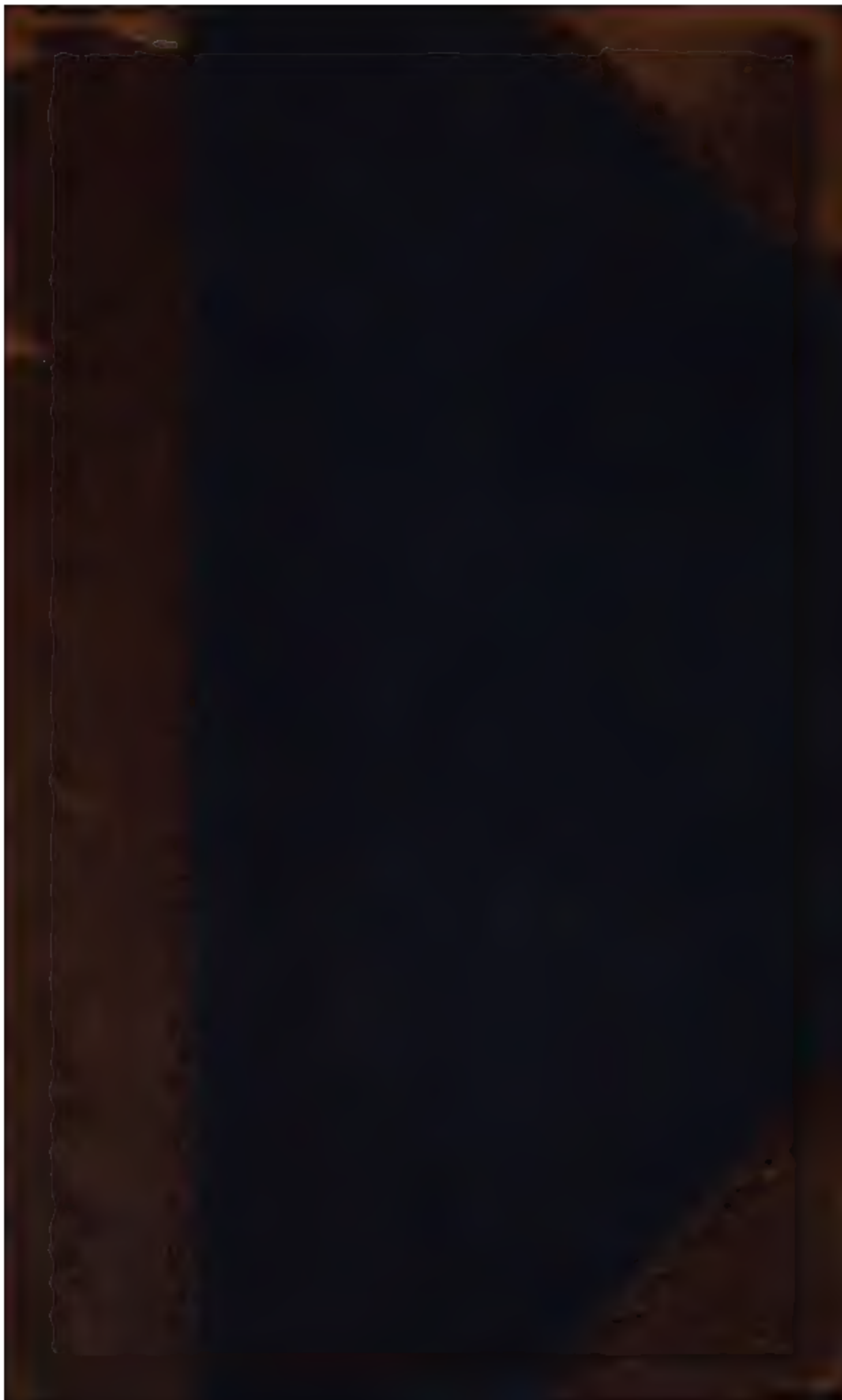
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THE
GARDENER'S
MONTHLY VOLUME.



THE PEACH;
ITS CULTURE, USES, AND HISTORY.

BY GEORGE W. JOHNSON,
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THE PEACH.

HISTORY.

THE peach is mentioned by the earliest writers upon Natural History, and always under a name that points to Persia as the place of its origin. Thus, among the Greeks, Dioscorides (l. i. c. 164,) calls it *Persikon melon* (the Persian apple) ; but the *Persion* or *Persikon* of Theophrastus (2 Hist. 3,) is, probably, the *Persea* of modern botanists, and, if so, widely differing from the peach.

This fruit was not known to the earliest Roman cultivators, for it is not mentioned by Cato in his work "*De Re Rustica*," though he enters minutely into the culture of other fruit trees ; but, in addition to this negative evidence, we have the direct testimony of Pliny, who wrote his Natural History in the first century of the Christian era, and he there states that the peach had been introduced about thirty years. The first Roman writer who dwells upon the culture of the peach, is Columella, who wrote, prob-

ably about the latter half of the first century of the Christian era, and whose writings are commended by Pliny.* The 10th book of Columella's "*De re Rustica*" is in verse, and "*On the Culture of Gardens*," in this, he speaks of the peach (v. 405,) as having been sent by the Persians to other nations, for the purpose of poisoning the inhabitants, but he speaks of it as a mere report, observing that in his time the fruit had not only lost the power of being hurtful, but yielded "ambrosial juices," though still retaining the name of the "Persian Apple." Pliny controverts the statement relative to the poisonous quality of the Persian peaches. Columella says, that the earliest were produced in Gaul, but that those introduced from Asia were slow in ripening. Palladius, who wrote, probably, about thirty years later than Columella, gives more full directions for the cultivation of

* This settles with tolerable certainty the time when Columella wrote, which has been hitherto considered a matter of more uncertainty. Pliny died A.D. 113, aged 52 years, and it is fair to presume, that he composed his great work when about 40 years old, which would be in A.D. 101. The peach, he says, had then been introduced about thirty years, which marks its introduction to Rome in A.D. 70. Now, as Columella speaks of its Roman cultivation, he must have wrote after this year; and as his writings are mentioned by Pliny, he must have written before the composition of the latter's *Natural History*. Columella, therefore, lived between the years 70 and 100 of the Christian era.

this fruit, and says there were then three kinds, viz. *Duracina*, probably a hard-fleshed cling-stone variety ; *Præcoqua Persica*, an early-ripe variety ; and *Armenia*, which is our apricot, but classed by the ancients among the peaches. Besides these and the two mentioned by Columella (the Gallic and the Asiatic), Pliny mentions two others—*Supernatia*, produced in the Sabine district of Italy, and *Popularia*.

Pliny observes upon the history rather than upon the cultivation of peaches, remarking that by their Latin name, *Persica*, proof is given that they were first brought from Persia to Rome ; adding that they are not a native of either Greece or Natolia. It was long, he says, before the peach was introduced at Rome, and it was not until after many trials that the Roman cultivators succeeded in establishing it in their gardens. In the Isle of Rhodes, which was its abiding place next to Egypt, the peach, in Pliny's time, was always unfruitful. (*Nat. Hist.* l. xv. c. 12 & 13.)

He goes on to observe that the *Duracina* was the best of all peaches, on account of the firmness of its flesh. The French and Asiatic peaches were so named from the regions whence they were imported. The peach, he says, was sold at the time of its first introduction for a Roman denier a piece, being equal to about eightpence of our money.

To our mind, the very name of *Popularia* is evidence that the peach soon became one of the com-

mon fruits of the Romans, and it is quite certain that it continues so, being cultivated as a standard throughout the length and breadth of the land.

The tenderness of the tree forbids the supposition that the Romans attempted its culture in Britain, nor is there any record justifying us to suppose that it was grown here before the reign of Henry the 8th (1509—1546). That monarch sent his gardener, who was a French priest, named Woolf, to travel on the continent, especially to gain improvement in the art of horticulture. He returned with the apricot and other fruits to the king's garden at Nonsuch, near Croydon, (Gough's *Topography* i. 133,) and among those may have been the peach; and thus much is certain, that Tusser, a contemporary,* mentions of fruits in our English gardens, three kinds of peach—the white, the red, and the yellow-fleshed. It was not ripened well, however, probably, for Heresbach, a contemporary of Tusser, says, its hardier relative, the apricot, was much preferred, “being used as a great dainty among noblemen.” Dodoens, another contemporary, says that the white and the yellow-fleshed were identical.

Gerarde, who wrote a very few years subsequently, viz. in 1597, says that there were three or four kinds of peach—the white fleshed—the red fleshed—the

* His “One Hundred Points of Good Husbandry” was published in 1557.

D'avant—and the yellow. He adds, "I have them all in my garden, with many other sorts." (Herball, 1259.) The D'avant we may conclude was of French extraction. Johnson, in his edition of Gerarde's Herball, in 1633, says "There are divers sorts besides the four set forth by our author, and which may be had of my friend Mr. Miller, in Old-street, viz., two sorts of Nutmeg peaches; the Queen's peach; the Newington peach; the Grand Carnation; the Carnation; the Black; the Melocotone; the White; the Roman; the Alberza; the Island; and Peach de Troy. These are all good. He hath also of that kind of peach which some call *Nucipersica*, or Nectarins, these following kinds: the Roman Red (the best of fruits); the Bastard Red; the Little Dainty Green; the Yellow; the White; and the Russet, which is not so good as the rest." He says that the

- D'avant peach was the *Persica Præcocia*. Great attention was now paid to this fruit, for Parkinson, whose *Paradisus* was published in 1629, enumerates twenty-one varieties, and says there were others without names; and six varieties of nectarines, which, he adds, "have been with us not many years." The names of the peaches enumerated by Parkinson are as follows:—

1. The Great White. 2. The Small White. 3. Carnation. 4. Grand Carnation. 5. Red. 6. Russet. 7. Island. 8. Newington. 9. Yellow. 10.

St. James. 11. Melocotone. 12. Peach du Troas. 13. Queen's. 14. Roman. 15. Durasme or Spanish. 16. Black. 17. Alberza. 18. Almond Peach. 19. Man Peach. 20. Cherry Peach. 21. Nutmeg Peach.

Mr. Ray, sixty years after Parkinson, gives a list of eighteen different sorts of peaches then in most esteem, the names of which are as follow :—

1. The White Nutmeg. 2. The Red Nutmeg. 3. The Troy Peach, so called from Troyes in Champagne. 4. The Isabella. 5. The Savoy. 6. The Bourdeaux. 7. The Early Newington. 8. The Old Newington. 9. Violet Muscate. 10. Persicum. 11. Modanese. 12. Morello. 13. Rumbulliam. 14. Bellice. 15. Scarlet. 16. Royal. 17. Ricket. 18. Bloody Monsieur. (*Hist. Plantarum* ii. 1516.)

The number of the varieties continued to increase as years passed on ; for, in the “Complete Gardener” of London and Wise, published in 1699, 33 are enumerated ; in 1707, Mortimer names 47 ; Switzer, in his “Practical Fruit Gardener,” in 1724, only enumerates the following, according to the order in which they ripen their fruit, but they are evidently a select list :—

RIPE IN AUGUST.

The White Nutmeg.

— Red Nutmeg, or Forward Troy Peach.

— Passe Violet, or Double Troy Peach.

The Anne, so called in compliment to Mrs. Ann Dunch, of Pusey, in Berkshire, where it was raised.

- Royal George, “some time in England,” first raised by Mr. Oram, in Brompton House.
- Yellow Alberg.
- Minion, or Mignon : said to be so called by a King of France, with whom it was a favourite.
- Bourdin.
- White Magdalen.
- Magdalen Musque.
- Little Alberge.

RIPE IN SEPTEMBER.

The Montaubon.

- Chevereuse, or Goat Peach.
- Nobless ; came from France.
- Old Newington ; native of England.
- Elrouge ; so named from being the reverse of *Gourle*, a famous nurseryman at Hoddesden, in the time of Charles II., by whom it was raised.
- Rumbullion.
- Admirable.
- Red Magdalen, Persic, Bellegarde, Andillis, Pan and Narbonne.

RIPE IN OCTOBER.

The Nivet.

- Catherine.

It was about this time that forcing the peach began

to be practised ; for, in the above work, Switzer gives plans for hothouses for forcing fruit trees, especially the vine, including a description of the first which had been erected at Belvoir Castle by the Duke of Rutland. Miller's Gardener's Dictionary appeared about the same time, and gave some slight directions on the subject ; but the first separate treatise on the general culture of this fruit did not appear until 1768. It was a translation from the French, entitled " A Treatise on the Culture of Peach Trees," and contains much useful information.. Next to this, in 1785 was published " A Treatise on the Management of Peach and Nectarine Trees, either in forcing-houses or walls," by Mr. Kyle, gardener to Baron Steward, of Moredun, near Edinburgh.

In 1786, Robert Browne, who filled a similar place in the establishment of Sir Harbord Harbord, of Gunton, in Norfolk, published one of the greatest of typographical curiosities, entitled " A Method to Preserve Peach and Nectarine Trees from Mildew." By having only thirty words on a page, and using very thick paper, a volume of 64 pp. is made, though it contains nothing but a list of subscribers, and a recipe how to make the common wash of soft soap and sulphur. In 1799, appeared, anonymously, a very excellent pamphlet, entitled " Letters to a Friend on the Pruning of Peach Trees and Vines ;" but a still more important work was issued from the Paris press

in 1814, by Mr. Mozard, entitled " Sur l'education du Pecher."*

France much preceded us in the culture of this fruit, for without reference to the peaches of Gaul mentioned by Columella, we shall find that from the very beginning of the 17th century, the age of Louis XIV., the commune of Montreuil, near Paris, has been celebrated for the culture and training of the peach ; and its industrious and laborious inhabitants are almost all exclusively devoted to the same pursuit, and with equal success. The fame of Montreuil attracted the attention of the famous La Quintinie, the founder and director of the fruit and kitchen garden at Versailles. La Quintinie, who was then considered the first trainer of trees in Europe, was astonished to hear that these simple villagers were successful, by following principles different from his own. He therefore engaged the son of Pepin, one of the most distinguished persons employed in training the peach in Montreuil, to leave his native village and come to Versailles, and train the trees in the royal gardens under his immediate inspection. It is unnecessary to mention the disputes that arose between young Pepin and his master, and we need only say that they

* Watts, in his *Bibliotheca Britannica*, deceived by the similarity of the names in French, has included, in his list of works on the peach, the works of Noel and Reste on the Fisheries (des Peches.)

did not agree ; that the young Pepin returned to train his father's trees at Montreuil, and that the *taille a la Quintinie* continued to be prevalent everywhere. The nobles and courtiers liked their gardeners to train their trees *a la Quintinie* ; that all sensible gardeners refused to do so, and preferred leaving their places, or to be turned away, rather than submit to the absurd system of *Quintinie*. It was a true revolt of good sense against an absolute folly.

However, justice was at length done to the Montreuil method, and that of the director of the fruit garden of Louis XIV. was condemned, as alike contrary to nature and the interest of the cultivator. This equitable judgment, declared a century after the death of *Quintinie*, and confirmed by experience, can no longer be questioned. In short, the system of *Quintinie* was founded on this axiom, "defer enjoyment, in order to enjoy for a longer time ;" an axiom very just in many things, but altogether false in the culture of fruit trees. *Quintinie* cut in very much, in order to keep the trees growing without producing fruit, and in the hopes of thereby making them live much longer ; but it so happened, both to *Quintinie*, and to those who followed his principles, that trees which bore fruit naturally, after being two or three years planted, did not do so when treated *a la Quintinie* till after ten years, and then only in a very small quantity, and sometimes not at all ; while trees pruned

according to the Montreuil method, at the age of ten years, paid a hundred times their cost, and a hundred times the rent of the land they occupied.

It is not a little remarkable, that the pruning of peach trees was brought almost to perfection at Montreuil about the time of Louis XIV., people do not know very well how, and that it has remained in the same state till within the last dozen years. During that short period, it has been brought to perfection, as M. Lelieur has demonstrated in his *Pomone Française*. The pruning of peach trees in France has been reduced to three schools, viz. :—The school of Quintinie, of which the principle was to cut short, and to retard the production of fruit, and to lengthen the lives of the trees. - Second, the school of Montreuil, of which the principle is to cut long, and the end to obtain abundance of fruit. Rogers Schabol is the most ardent of the numerous panegyrists of this mode. Third, the modern school, of which the principle is the same as that of the school of Montreuil, and the end to obtain trees full and regular in their branches, without these being confused or crossing each other, and well furnished with fruit. M. le Count Lelieur was the founder of the school in 1817, in collecting its scattered elements, which already existed in the practice of many cultivators, and in joining thereto the results of his own experience. The addition which Count Lelieur may be said to have

made to the Montreuil method, consists in filling up the two sides and the centre of the tree with branches. In the Montreuil method, there are two main branches allowed to every tree. These are, in general, trained in at an angle of 45 degs., and the side branches proceeding from them are laid in in such a manner as to cover great part of the wall. There is always, however, a space in the centre of the tree and also one on each side of it next the ground, which is left naked. Now, the grand object of Lelieur's method, or that of the modern school, is to fill up these naked spaces with bearing wood. This is to be effected by shortening the two main branches when young, so as to produce four branches ; and the side shoots of these being trained in with care, the wall will generally be found filled up. In doing this, when the lower branches of the tree are found weak, they are not trained in like the others, but allowed to grow right out for two or three months, during which time they acquire a degree of strength as great as that of the branches on the upper part of the tree. The methods of the three schools are evidently different modifications of what in England is called fan-training ; and there can be no doubt whatever, that the modern method, its object being to cover the wall completely with wood, is by far the best.

The origin of training the peach and the vine

against walls is thus given by Rogers Schabol. A cultivator of Montreuil having by chance thrown a peach against a wall with a south aspect, it grew up and produced fruit, which, from the shelter and heat of the wall, were found to be larger, more succulent, and of better flavour, than those produced on standard trees. This cultivator, seeing that the heat of the wall was favourable to the peach, fastened the shoots to it with nails and ties, and found the fruit still larger and better. In what year this cultivator lived is not stated; but he is considered as much more likely to be the inventor than Girardot, who lived in the time of Louis XIV., when training the peach had already been practised at Montreuil sufficiently long to produce young Pepin, who was the pupil of his father, already celebrated for training the peach. (*Annales d'Horticulture* xix.)

The deserved celebrity of Montreuil for peaches still continues; but although many have, no doubt, heard of Peches de Montreuil, Figues d'Argenteuil, Abricots de Triel, and Raisins de Fontainebleau, yet, perhaps, few have ever visited these places. It is generally known that French gardeners' delight is "specialities;" when they find any kind of culture particularly lucrative, or when the soil and air of one place is more congenial than another, that they almost invariably abandon a general trade or unfavourable situation, and direct all their energies to that one

favourite object. Not only is this the case with fruit, but equally so with flowers and plants. Montreuil-aux-Peches is about four miles east of Paris, and, together with the adjoining village of Bagnolet, has long been renowned for its peaches and nectarines ; so much so, that Paris and the country for 50 miles round is almost entirely supplied from these two places. It is, in fact, their staple article of trade, and one by no means inconsiderable, if report speaks truly of the amount, which is stated to be, on the average, 80,000 francs a year, independent of other fruits. An exact estimate of a produce so entirely regulated by the state of the weather is very difficult to ascertain. The year 1841 was unproductive, and the long continuance of wet and cold also materially checked the consumption : 1842, on the contrary, was exceedingly prolific, and the excessively hot weather in August augmented the demand in an equal ratio ; and it is said that the sale that season realised more than 120,000 francs. Large as this sum may at first sight appear, it will not, upon reflection, be found exaggerated, when the number and extent of gardens is taken into consideration. The markets and streets of Paris were literally glutted at the end of July ; and in August, fine fruit was sold at one penny, and very good at a halfpenny each. The gardens vary in size, from one-half to a whole acre, and are surrounded with walls about 8 ft. high, rising

amphitheatrically one above another to the top of the hills. They give the neighbourhood a picturesque appearance. The soil is generally a deep sandy loam, with here and there a mixture of blue clay, similar to that of Montmatre and Pere la Chaise. Most of the trees are old, yet their general appearance is healthy, which the cultivators attribute as much to their being worked upon almond stocks as to the suitability of the soil. Fan-shaped training is usually adopted; but another form, called "Espalier carre," is now coming into vogue. M. Lepere, of Montreuil, claims to be the originator of this system, which, however, is warmly disputed by some others. It appears to be little, if at all, different from the horizontal training which has for many years been practised in England. As the design of these gardeners is profit, it may readily be supposed that the varieties are chiefly confined to those which are most prolific, or produce the finest fruit in their different seasons of maturity. At almost every cultivator's are the Petite and Grosse Mignonne, Chevreuse hative, Galande, Magdeleine, Bourdine, Admirable, Belle de Paris, Royale, Pavie, and Teton de Venus, with a few nectarines, such as Violette hative, Musque, and Gross Violette. (*Gard. Chron.* 1842, 870.)

BOTANICAL CHARACTERS.

THE peach, *Persica vulgaris*, was distinguished by early botanists as *Amygdalus Persica*, and belongs to the Icosandria Monogynia class and order of the Linnæan system, and to the Rosaceæ of the natural arrangement. In its natural state the tree is under the middle size, with spreading branches; *Leaves* conduplicate when young, lanceolate, glabrous, and serrated; *Flowers* almost sessile, solitary or twin, rising from the scaly buds earlier than the leaves, with reddish calyxes, and pale or dark red corollas. *Fruit*, a fleshy drupe, with a velvety epicarp; roundish, generally pointed, with a longitudinal groove; the pulp, or sarcocarp, large, fleshy, succulent, usually white or yellowish, but sometimes reddish, and abounding with a grateful sweet-acid juice. The stone hard, having its shell, or putamen, wrinkled with irregular furrows, and its kernel bitter.

Its native country, both by the ancients and moderns, has been considered to be Persia, but it is also found wild in various parts of Asiatic Turkey. Pallas also found it in the southern districts of the Caucasus; and it has been truly observed, that from its frequency of occurrence, and its fruitfulness with but little cultivation between 30 and 40 degs. N. latitude,

we may conclude that within them is its most favourable habitat.

It endures our usual winters uninjured, and even succeeds as a standard in latitudes of N. America where the winters are much colder, and the summers hotter than with us. This is in conformity with the well-ascertained fact, that all deciduous trees suffer less from severe frost in winter, if their wood is perfectly matured by sufficiently warm summers, than where the frosts are less severe, but the summers also more temperate. Hence in the north of England young peaches are often injured by degrees of cold that do not affect others of similar age when exposed to them near London.

Where the mean temperature of the summer months is above 70 degs., or that of the warmest month above 75 degs., as at Rome and at New York, the *melting* varieties of this fruit are not so richly succulent as when grown against south walls in the more temperate summers of London and Paris. But, on the other hand, the *firm-fleshed* or *clingstone* varieties are preferred in America, though but little esteemed in England.

The peach is usually considered a short-lived tree, but we have no record of the age it is known to attain in its native state. When judiciously cultivated in England, it will continue vigorous and fruitful at the age of forty years.

The late Mr. Knight inclined to the opinion that the almond and peach are mere varieties of the same species, and asks, "if the peach be an originally distinct species, where could it have lain concealed from the Creation to the reign of Claudius Cæsar?" We do not incline to the opinion that the almond and peach are specifically the same; but if we did, we should not think that the opinion was strengthened by the negative fact alluded to by Mr. Knight, even if it were a fact, which it is not. We have seen that it was noticed by some of the earliest authorities extant, and though Cato does not mention the peach, yet he is equally silent regarding the almond. The evidence from Mr. Knight's experiments, however, preponderate towards shewing that though the blossoms of the almond may be impregnated with pollen from either the peach or nectarine, yet, that plants raised from this hybridization are themselves incapable of producing fertile pollen, and therefore shewing that the offspring is a true mule; infertile, because engendered between two distinct species.

Although it is doubtful whether the almond and peach are specifically the same, there appears to be much less doubt as to the latter being parent of the nectarine.

In the Linnean Correspondence, it is stated, that a tree bought for a nectarine produced peaches; the next year it bore nectarines and peaches, and continued do-

ing so for twenty years after. P. Collinson informs Linnaeus that at Lord Wilmington's a tree produced both nectarines and peaches. Sir J. E. Smith, the editor, says, that several instances of this have occurred ; and that he was presented with a fruit half nectarine and half peach. It grew on a tree which usually bore nectarines and peaches ; but in two seasons, at some years' distance from each other, the same tree produced half a dozen of these combined fruits.* Collinson mentions that he saw both fruits on the same tree close to each other ; and that a peach produced a nectarine from a stone, and not a peach, in his own garden. Without knowing the foregoing facts, Professor Chapman also stated, that in Virginia peach trees lived a number of years, and that when they were very old, he had often seen them bear nectarines. The fact is well known, he says, to all old natives of Virginia. (*Gard. Mag.* vi. 596.)

* This is by no means an uncommon occurrence.—ED.

CHEMICAL COMPOSITION.

The peach was analyzed by M. Berard, both in an unripe and ripe state, and found composed of

	Unripe.	Ripe.
Chlorophylle	0.04	..
Colouring matter.....	..	0.10
Sugar	trace	16.48
Gum.....	4.10	5.12
Vegetable fibre.....	3.61	1.86
Albumen	0.76	0.17
Malic Acid	2.70	1.80
Lime	trace	trace
Water	89.39	74.87
	100.00	100.40

(*Thomson's Organic Chem. Vegetables*, 890.)

Hydrocyanic or Prussic acid is a component of the leaves, flowers, and kernel of the fruit.

VARIETIES.*

Abricotee (*Abricotee a Noyeau partage*, *Admirable Jaune*, *Grosse Jaune*, *Grosse Peche Jaune Tardive*, *D'Abricot*, *De Burai*, *D'Orange*, *Sandalie Hermaphrodite*, *Yellow Admirable*).—Leaves with reniform glands, flowers large, flesh melting, colour yellowish red, size large, quality indifferent, season beginning of October.

Acton Scot.—Leaves crenate, with globose glands,

* Authorities, Hort. Soc. Catalogue; Lindley's Guide to the Orchard; Switzer, &c.

flowers large, pale rose, flesh melting, colour pale yellowish and red, middle-sized, quality first-rate, season end of August, not large but handsome, and a very excellent early peach. Raised by Mr. Knight in 1811, by impregnating the Noblesse with the Red Nutmeg.

Admirable, Early, (Admirable (English), L'Admirable (French), Belle de Vitry (of the Bon Jardinier).—Leaves crenate, with globose glands, flowers middle-sized, pale-red, fruit middle-sized, flesh melting, quality good.

Admirable, Jaune, see Abricotee.

Admirable, Late (Royal, La Royale, Pêche Royale, Bourdine, Boudine, Boudin, Narbonne, French Bourdine, Teton de Venus, Belle Bausse of some, Belle Bance *ib.*, Judd's Melting, Late Purple of some, Motteux's, Pourpree Tardive *ib.*).—Leaves with globose glands, flowers small, flesh melting, colour pale yellowish and red, size large, quality first-rate, season middle or end of September; one of the very best late peaches, and ought to be in every collection; is very proper for the peach-house to succeed the earlier sorts.

Admirable, Late, see Belle de Vitry (of Duhamel)

Admirable, Yellow, see Abricotee.

Admirable, Scarlet, (Dragon).

Alberge (of some), see Portugal.

Alberge, Yellow, (Purple Alberge, Red Alberge, Golden Mignonne, Gold Fleshed, Alberge Jaune, Pêche Jaune).—Leaves crenate, with globose glands, flowers pale crimson, small, flesh melting, colour yellow and darkish red, middle-sized, quality indifferent, season end of August and beginning of September, flesh yellow. Bears as a standard at Brompton.

Alberge Jaune, see Rosanna.

Almond Peach.—Leaves serrated, glandless, flowers large and pink, flesh melting, colour pale yellowish and red, middle-sized, quality indifferent, season middle

of September. Raised by Mr. Knight, in 1815, from an almond, impregnated by a peach.

American Clingstone, see Braddick's North American.

Anne, see Early Anne.

Ansley's, Colonel, see Barrington.

Avant, see Grosse Mignonne

Avant, Bear's Early, see Bear's Early.

Avant, Blanche, see White Nutmeg.

Avant, Early, see Pourpree Hative.

Avant, Early Purple, see Grosse Mignonne.

Avant, Pêche Jaune.

Avant, Johnson's Purple, see Grosse Mignonne.

Avant, Johnson's Early Purple, see *ib.*

Avant, Pêche de Troyes, see White Nutmeg.

Avant, Purple, see Grosse Mignonne.

Avant, Red, see Red Nutmeg.

Avant Rouge, see Red Nutmeg.

Avant Rouge, (of some,) see Pourpree Hative.

Avant, White, see Early Anne.

Barrington (Buckingham Mignonne, Colonel Ansley's.)—Leaves with globose glands, flowers large, flesh melting, colour pale yellow and red, size large, quality first-rate, season middle of September, tree vigorous, and a good bearer, not subject to mildew. Raised about 40 years ago by Mr. Barrington, of Barwood, in Surrey.

Bear's Early, (Bear's Early Avant).

Belle Bausse, see Grosse Mignonne.

Belle Baucé, see *ib.*

Belle Beaute, see *ib.*

Belle de Beaucaire.—Leaves with globose glands, flowers small, flesh melting, colour pale green and darkish red, size large, quality first-rate, season beginning of September. Very like Bellegarde.

Belle Chevreuse, (Chevreuse, Early Chevreuse).—Leaves with reniform glands, flowers small, flesh

melting, colour pale yellow and red, size large, quality indifferent, season beginning of September. Not so good as the Chancellor, to which it is allied.

Belle Tillemount.

Belle de Vitry, of Duhamel (Late Admirable, Bellis, Admirable Tardive).—Leaves doubly serrated and glandless, flowers small and dull red, fruit middle-sized, flesh melting, greenish yellow, quality good. Ripe end of September. Requires a S. or S.E. wall.

Belle de Vitry, (of the Bon Jardinier,) see Early Admirable.

Belle de Paris, see Malta.

Bellis, see Belle de Vitry of Duhamel.

Betterave, see Sanguinole

Bellegarde, (Galande, Noir de Montreuil, Violette Hative of the English, Violette Hative Grosse *ib.* Early Galande of some, Brentford Mignonne, Ronalds's Brentford Mignonne, French Royal George, Smooth-leaved Royal George of some, Large Violet, French Violette Hative of some English nurseries only, for the Peches Violettes of the French are Nectarines).—Leaves crenate, with globose glands, flowers small, reddish pink, flesh melting, colour pale green and dark red, size large, quality first-rate, season beginning and middle of September. A very handsome and excellent peach, forces well, succeeds Royal George and Grosse Mignonne, and keeps better than they do after being gathered.

Black, Swainson's (Swainson's). — Leaves with globose glands, flowers small, flesh melting, colour dark red, middle-sized, season beginning of September.

Blood Clingstone (Claret Clingstone). — Leaves serrated, glandless, flowers large, flesh clingstone, colour dark red, middle-sized, quality indifferent, season October.

Bloody, see Sanguinole.

Boudin, see *Late Admirable*.—Said to have been raised by a French gardener named Bourdine in the reign of Louis XIV.

Boudine, see *ib.* *Bourdine*, see *ib.*

Bourdine, French, see *ib.*

Bourdine, Early, of some, see *Royal George*.

Braddick's North American (*Braddick's*, *Braddick's American*, *Braddick's American Yellow*, *American Clingstone*).—Leaves crenate, with globose glands, flowers pale pink, small, flesh clingstone, colour yellowish red, size large, quality bad, season middle and end of September, flesh yellow, firm, and coarse.

Braddick's New York.—Leaves with reniform glands, flowers small, flesh melting, colour pale green and red, middle-sized, quality indifferent, season beginning of September.

Braddick's South American (*South American*).

Braddick's Red.—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and darkish red, size large, quality first-rate, season end of August and beginning of September. Resembling the *Royal George*.

Braddick's Summer.—Leaves with reniform glands, flowers small, flesh melting, colour pale green and red, size large, quality indifferent, season end of August.

Burai, see *Abricotee*.

Burchell's Early. *Burlington Large Early*.

Cambray.—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August. Resembles *Malta*.

Cardinal (*Le Cardinal*, *Cardinal de Furstenburgh*).—Leaves serrated, glandless, flowers large, flesh melting, colour red, size large, quality indifferent, season October, flesh red like beetroot; of little merit in this climate.

Caroline, Kennedy's.—Leaves with reniform glands,

flowers small, flesh clingstone, colour yellow and red, middle-sized, quality indifferent, season end of September, flesh yellow.

Catherine.—Leaves crenate, with reniform glands, flowers small, reddish, flesh clingstone, colour pale green and red, size large, quality first-rate, season end of September and beginning of October ; one of the best late clingstone peaches ; requires a S. wall.

Catherine, Green (of the Americans).—Leaves with globose glands, flowers small, flesh melting, colour pale green and red, middle-sized, quality bad, season end of September.

Catherine, Williams's.—Leaves with reniform glands, flowers small, flesh clingstone, colour pale green and red, size large, quality indifferent, season end of September and beginning of October ; very like the *Catherine*.

Catline.—Leaves with globose glands, flowers small, flesh clingstone, colour pale yellow and red, middle-sized, quality indifferent, season middle and end of September.

Chancelliere (Veritable Chancelliere, Grandes Fleurs).

Chancellor (Chancelliere var. of Duhamel, Noisette, Late Chancellor, Steward's Late Galande, Edgar's Late Melting).—Leaves crenate, with reniform glands, flowers reddish, small, flesh melting, colour pale yellow and red, size large, quality first-rate, season middle of September, flesh deeply tinged with red at the stone. Said to have been raised from a seed of the Chevreux by M. de Segulier, Chancellor of France.

Chancellor, French, see Royal George.

Chevreuse, see Belle Chevreuse.

Chevreuse Early, see Belle Chevreuse.

Chevreuse d'Italie.

Chevreuse, Late (Chevreuse Tardive, Pourpree).

Chevreuse, Yellow.—Leaves with globose glands, flowers small, flesh melting.

Chinese Peach, see Flat Peach of China.

Claret Clingstone, see Blood Clingstone.

Congress.—Leaves with reniform glands, flowers small, flesh clingstone, colour pale yellow and red, size large, quality indifferent, season end of September; resembles the Catherine.

Cothelstone Seedling.

Cooper's Early.—Leaves with globose glands, flowers small, flesh clingstone, colour pale yellow and red, middle-sized, quality bad, season beginning of September.

Craavey's.—Leaves with globose glands, flowers small, flesh melting, colour pale yellow and red, middle-sized, quality indifferent, season end of September.

Dorsetshire, see Nivette.

Double Blossomed (Pecher a Fleurs Doubles, Pecher Nain a Fleurs Doubles, Pecher a Fleurs Semi-doubles).—Leaves with reniform glands, flowers large, flesh melting, colour pale yellow and red, size small, season beginning of September. Worthless as regards its fruit.

Double Montagne (Montagne, Montauban).—Leaves serrated, glandless, flowers large, flesh white, melting. Apparently the same as Noblesse, yet it ripens some days earlier, and cannot like that have a Muscle plum stock.

Double Swalsh (Swalze or Swolze, Swalch, Dutch).—Leaves crenate, with reniform glands, flowers small, dark red, fruit middle sized, pale yellow and deep red, flesh melting, season early September. Brought to England by Lord Peterborough before 1729.

Double Swalsh, (of some,) see Royal George.

Double de Troyes, see Petite Mignonne.

Downton, Early.—Leaves crenate, globose glands, flowers large, pale rose, flesh melting, pale yellow and red, middle-sized, quality first-rate, season end of Au-

gust. Good, but scarcely equal to the Acton Scot, which it otherwise resembles. Raised by Mr. Knight in 1812.

Dragon, see Scarlet Admirable.

Druselle, see Sanguinolle.

Dutch, see Double Swalsh.

Dunnington Beauty.—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August and beginning of September. Very like Noblesse.

Early Anne (Anne, White Avant of some).—Leaves doubly serrated, glandless, flowers large, nearly white, flesh melting, colour white, middle-sized, quality indifferent, season beginning and middle of August, handsome and tolerably well flavoured, but earliness is its chief recommendation. Raised a century and half since, and said to be named after the celebrated Anne Dunch, of Pudsey, Berks.

Early French, see Grosse Mignonne.

Early May, see *ib.*

Early Purple, see Veritable Pourpree Hative.

Early Purple, Neil's, see Grosse Mignonne.

Early Purple of Kew, see Royal Charlotte.

Early Purple, True, see Veritable Pourpree Hative.

Early Red.—Leaves with globose glands, flowers large, flesh melting, colour pale yellow and red, middle-sized, quality indifferent, season end of August.

Early Sweetwater.

Early Vineyard, see Grosse Mignonne.

Edgar's Late Melting, see Chancellor.

Emperor of Russia (Serrated, New Serrated, Unique, New Cut-leaved).—Leaves serrated, glandless, flowers small, flesh melting, colour pale yellow and dark red, size large, quality indifferent, season September, seems a shy bearer.

Flat Peach of China, (Chinese Peach, Pen To,

Java Peach).—Leaves crenate, with reniform glands, flowers large, fruit flat, about $2\frac{1}{2}$ inches in diameter, but only $\frac{3}{4}$ inch thick, flesh melting, yellow with beautiful crimson near the stone, size small, quality indifferent, season beginning or middle of September. May be forced and ripened very early in pots with greater facility than any other variety; on this account it merits some estimation, besides being an object of curiosity. First ripened in England by Mr. Braddick in 1819.

Fleurs Doubles, Pecher a, see Double Blossomed.

Fleurs Semidoubles, Pecher a, see Double Blossomed.

Ford's Seedling.—Leaves doubly serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August and beginning of September; resembles much the Noblesse, but is not its superior.

Forster's, see Grosse Mignonne.

Forster's Early, see *ib*.

Galande, see Bellegarde.

Galande, Ronald's Early, see *ib*.

Galande, Ronald's Seedling, see *ib*.

Galande, Early, see *ib*.

Galande, Fuller's.—Leaves with globose glands, flowers small.

Galande, New.

Galande, Steward's Late, see Chancellor.

George the Fourth.—Leaves large, acutely crenate, with globose glands, flowers small, dull red, flesh melting, colour pale yellow and red, size large, quality first-rate, season beginning of September. Raised by Mr. Gill, of New York, in 1819.

Gloria, De.

Gold Flesked, see Yellow Alberge.

Grandeville.—Leaves serrated, glandless, flowers large.

Golden Purple.—Leaves with reniform glands, flowers small, flesh clingstone, colour yellow and dark red, middle-sized, quality bad, season middle of September.

Grande Monarque.—Leaves with reniform glands, flowers small.

Gross Jaune, see *Abricotee*.

Grosse Jaune Tardive, see *Abricotee*.

Grosse de Vitry.

Heath (Fine Heath, Heath Clingstone, Red Heath).—Leaves with reniform glands, flowers small, flesh clingstone, colour pale yellow and red, size large, quality first-rate, season October. In a hot season one of the very best late Clingstones, but the climate of this country is in general too cold for it.

Hemskirke.—Leaves doubly serrated, glandless, flowers pale rose, large, flesh melting, colour pale green and red, middle-sized, quality first-rate, season end of August. Raised at the Royal Gardens, Kensington, at the beginning of the present century.

Holmes's, see *Twyford*.

Hoffmann's, see *Morrisania Pound*.

Hoffmann's Favourite.—Leaves with reniform glands, flowers small, flesh melting, colour white and red, middle-sized, season beginning of September.

Hoffmann's White.—Leaves with reniform glands, flowers small, flesh melting, colour white and red, middle-sized, quality first-rate, season beginning or middle of September

Incomparable (Pavie Admirable).—Leaves crenate, with reniform glands, flowers small, flesh clingstone, colour pale yellow and red, size large, quality bad, season end of September and beginning of October. Larger than the *Catherine*, but not so good.

Incomparable en Beaute.—Leaves with globose glands, flowers small, flesh melting, colour pale yellow

low and greenish red, size large, quality indifferent, season middle of September.

Incomparable, White Blossomed (White Blossomed).—Leaves with reniform glands, flowers large, flesh melting, colour white, size large, quality indifferent, season end of August and beginning of September. Singular on account of its white blossoms and pale fruit.

D'Ispahan (De Perse).—Leaves serrated with reniform glands, flowers large, flesh melting, colour green and red, size small, quality bad, season middle of September.

Italian, see Malta.

Java Peach, see Flat Peach of China.

Judd's Melting, see Late Admirable.

Kennedy's Carolina Clingstone, see Kennedy's Lemon Clingstone.

Kensington, see Grosse Mignonne.

Kew Seedling (Kew Royal Seedling).—Leaves with globose glands, flowers small, flesh melting, colour pale yellow and dark red, middle-sized, quality indifferent, season beginning of September.

Knapp Castle Seedling.—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August and beginning of September. Very like Noblesse.

Knight's Early (Knight's Early Seedling).—Leaves with globose glands, flowers large, flesh melting, colour pale green and dark red ; middle-sized, season middle of August. Resembles the Acton Scot, nearly as good.

Langier.

Large Early.

Large Violet, see Bellegarde.

Late Purple (Pourpree Tardive).—Leaves with reniform glands, flowers small, flesh melting, colour

pale green and dark red, size large, quality indifferent, season end of September; allied to the Chancellor.

Late Purple (of some), see *Late Admirable*.

Lockyer's, see *Royal George*.

Lord Fauconberg's, see *Royal Charlotte*.

Lord Nelson's, see *Royal Charlotte*.

Lemon Clingstone.—Leaves with reniform glands, flowers small, flesh clingstone, colour yellow and red, size large, quality indifferent, season end of September, flesh yellow, like that of the two following; all three are esteemed in America for sweetmeats.

Lemon Clingstone (Hoyte's).—Leaves with globose glands, flowers small, flesh clingstone, colour yellow and darkish red, size large, quality indifferent, season end of September.

Lemon Clingstone, Kennedy's (Kennedy's Carolina Clingstone, Pine Apple Clingstone, Pine Apple, Large Yellow Pine Apple, Red Mallacoton).—Leaves with reniform glands, flowers small, flesh clingstone, colour yellow and red, size large, quality indifferent, season end of September.

Limon.

Low's Large Melting.—Leaves serrated, glandless, flowers small, flesh melting, colour pale yellow and greenish red, size large, quality indifferent, season beginning of September. Allied to the *Royal George*, larger but not so good.

Madeleine. — Leaves serrated, glandless, flowers small.

Madeleine Blanche, see *White Magdalen*.

Madeleine de Bollwiller.—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and dark red, middle-sized, quality first-rate, season beginning or middle of September.

Madeleine de Courson (Red Magdalen of Miller, *Madeleine Rouge*, *Rouge Paysanne*, French Magdalen).—Leaves doubly serrated, glandless, flowers pale

blush, large, flesh melting, colour pale yellow and red, middle-sized, quality first-rate, season end of August and beginning of September, flesh with very little red at the stone; the tree is a good bearer, but rather tender.

Madeleine a Moyennes Fleurs, see Royal Charlotte.

Madeleine Rouge Tardive, see *ib.*

Madeleine a Petites Fleurs, see *ib.* and Royal George.

Madeleine Tardive, see Royal Charlotte.

Magdalen Red, see Royal George.

Magdalen Red, (of Miller,) see *Madeleine de Courson*.

Madeleine a Mamelon.

Magdalen White (*Madeleine Blanche*, Montagne Blanche).—Leave doubly serrated, glandless, flowers pale rose, large, flesh melting, colour yellowish white and red, middle-sized, quality indifferent, season middle or end of August.

Malta (Italian, *Pêche de Malte*, *Belle de Paris*, *Malte de Normandie*).—Leaves serrated, glandless, flowers pale, large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August and beginning of September, hardy; fruit keeps well after being gathered, and bears carriage; deserves cultivation, and would probably succeed as a standard.

Mammoth (*Sachamoon*).

Marlborough, see *Grosse Mignonne*.

Melecoton, Gros, see *Pavie de Pomponne*.

Mellacoton, Red, see *Kennedy's Lemon Clingstone*.

Mellish's Favourite, see *Noblesse*.

Mignonne, American. — Leaves with reniform glands, flowers small, flesh melting, colour pale yellow and red, size large, quality indifferent, season end of September; near the Chancellor.

Mignonne, Brentford, see *Bellegarde*.

Mignonne, Buckingham, see *Barrington*.

Mignonne, Cobb's.—Leaves with globose glands.

Mignonne, Dorsetshire.—Leaves with reniform glands, flowers small, flesh melting, colour pale yellow and dark red, size large, quality indifferent, season end of September.

Mignonne, Early, see *Petite Mignonne*.

Mignonne, Earliest.—Leaves with globose glands, flowers small.

Mignonne, Golden, see *Yellow Alberge*.

Mignonne, Grosse (Grimwood's Royal George, Grimwood's New Royal George, Large French Mignonne, French Mignonne, Mignonne, Vineuse, Velontee, Velontee de Merlet, French Grosse Mignonne, Swiss Mignonne, Pourpree de Normandie, Pourpree Hative of some, Purple Hative, *ib.*, Early Purple Avant, Purple Avant, Avant, Early May, Early French, Early Vineyard, Padley's Early Purple, Neil's Early Purple, Neal's Early Purple, Johnson's Early Purple, Johnson's Purple Avant, Forster's, Forster's Early, Ronald's Early Galande, Ronald's Seedling Galande, Belle Bausse, Belle Bauce, Belle Beaute, Early Vineyard, Kensington, Royal Kensington, La Royale of some, Superb Royal, Vineuse de Fromentin, Transparent).—Leaves crenate, with globose glands, flowers pale rose and large, flesh melting, colour yellow and red, size large, quality first-rate, season end of August and early in September; good bearer and forces well; trees not subject to mildew.

Mignonne, Griffin's, see *Royal George*.

Mignonne, Lockyer's, see *ib.*

Mignonne, Large Fruited.—Leaves serrated, glandless, flowers large.

Mignonne, Lord Fauconberg's, see *Royal Charlotte*.

Mignonne, Millet's, see *Royal George*.

Mignonne, Petite (Small Mignonne, Early Mignonne, Mignonette, Double de Troyes, Peche de Troyes).—Leaves crenate, with reniform glands, flow-

ers small, flesh melting, colour pale yellow and red, size small, quality first-rate, season beginning or middle of August ; succeeds the Brown Nutmeg.

Mignonne, Purple.

Mignonne, Ronald's Brentford, see Bellegarde.

Mignonne, Royal.

Mignonne, Woburn Early.—Leaves serrated, glandless, flowers large.

Mignonne, Yellow.—Leaves with reniform glands, flowers small, flesh melting, colour pale green and pale red, size small, quality indifferent, season end of September, flesh dull yellow.

Monstrous Pavie of Pomponne, see Pavie de Pomponne.

Morrisania Pound (Morrison's Pound, Pound, Hoffman's).—Leaves with globose glands, flowers small, flesh melting, colour pale green and red, size large, quality first-rate, season middle or end of September. One of the best of the American varieties, yet its merit is not quite equal to that of the Late Admirable, the one it most resembles.

Montagne, see Double Montagne.

Montagne Blanche, see White Magdalen.

Montauban, see Double Montagne.

Motteux's, see Late Admirable.

Mountaineer.—Leaves with globose glands, flowers large, flesh melting, colour pale yellow and red, size large, quality first-rate, season beginning of September ; fruit sometimes partly smooth : raised between the Red Nutmeg peach and Violette Hative nectarine.

Nain, Pecher (Pecher Nain d'Orleans, Dwarf Orleans, Pot Peach).—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red.

Nain a Fleurs Doubles, see Double Blossomed.

Narbonne, see Late Admirable.

Newington, Old (Newington).—Leaves doubly ser-

rated, glandless, flowers pale pink, large, flesh clingstone, colour pale green and red, size large, quality first-rate, season beginning of September. Very good as a Clingstone peach.

Newington Smith's (Early Newington, Newington, Smith's Early Newington).—Leaves serrated, glandless, flowers pale pink and large, flesh clingstone, colour pale green and red, middle-sized, quality indifferent, season end of August and beginning of September.

Newington (of the Americans).—Leaves with globose glands, flowers small, flesh clingstone, colour pale yellow and dark red, size large, quality indifferent, season end of September and beginning of October.

New, Cut-leaved, see Emperor of Russia.

New Serrated, see *ib.*

Nivette (Nivette Velontee, Velontee Tardive, Dorsetshire).—Leaves crenate, with globose glands, flowers pale red and small, flesh melting, colour pale green and red, size large, quality first-rate, season middle of September ; very like Late Admirable, but the tree is said to be more tender.

Noblesse (Mellish's Favourite, Vanguard, Lord Montague's Noblesse).—Leaves doubly serrated, without glands, flowers pale blush and large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August and beginning of September ; one of the very best, either for forcing or for the open wall. G. Lindley says that the Noblesse and Vanguard are not the same.

Noblesse, Early.

Noblesse of Oatlands.—Leaves serrated, glandless, flowers large.

Noblesse, Pitmaston Seedling.

Noblesse, Seedling, (New Noblesse). — Leaves doubly serrate, glandless, flowers large and pale pink, fruit middle-sized, flesh green and yellow, quality first-rate. Ripe early in September.

Noire de Montreuil, see Bellegarde.

Noisette, see Chancellor.

Nutmeg, Early Yellow.

Nutmeg, Periods Early.—Leaves with reniform glands, flowers small.

Nutmeg, Red (Brown Nutmeg, Early Red Nutmeg, Avant Rouge, Avant Peche de Troyes, Red Avant).—Leaves small, crenate, with reniform glands, flowers large, flesh melting, colour pale yellow and dark red, size small, quality indifferent, season end of July and beginning of August.

Nutmeg, White (Early White Nutmeg, Avant Blanche, White Avant).—Leaves small, serrated, glandless, flowers pale blush and large, flesh melting, colour white, size small, quality indifferent, season middle of July; has little merit except that of being the earliest.

Orange, De, see Abricotée.

Ord's Peach.—Leaves with reniform glands, flowers small, flesh melting, colour yellowish green and red, size large, quality indifferent, season beginning and middle of September; allied to the Chancellor, but not so good.

Orleans, Dwarf, see Pecher Nain.

Orleans, Nainde, see Pecher Nain.

Padley's Early Purple, see Grosse Mignonne.

Pavie de Pompone (Pavie de Pompone Grosse, Monstrous Pavie of Pompone, Gros Perseque Rouge, Gros Melecoton, Pavie Monstrueux, Pavie Rouge de Pompone, Pavie Rouge, Pavie Canui).—Leaves crenate, with reniform glands, flowers large, edges crumpled, flesh clingstone, colour yellow and darkish red, size large, quality indifferent, season middle and end of October; will not ripen except in a warm season and good situation.

Pavie de Jalagnier.

Pavie Jaune.

Pêche-Jaune, see *Alberge Jaune*, and *Rosana*.

Pêche Royale, see *Late Admirable*.

Peen To, see *Flat Peach of China*.

De Perse, see *Pêche d'Ispahan*.

Persique (*Perseque*, *Gros Perseque*, *Perseque Al-longee*).—Leaves with reniform glands, flowers small, flesh clingstone, colour yellow and red, size large, quality indifferent, season October. Requires a warm soil and situation.

Perseque Rouge Gros, see *Pavie de Pompone*.

Pine Apple, see *Kennedy's Lemon Clingstone*.

Pine Apple, Large Yellow, see *ib.*

Pine Apple Clingstone, see *ib.*

Pound, see *Morrisania Pound*.

Portugal (*Alberge of some*).—Leaves crenate, with reniform glands, flowers small, flesh clingstone, colour pale yellow and red, size large, quality indifferent, season end of September and beginning of October. A white-fleshed Late Clingstone.

Port Royal.—Leaves serrated, glandless, flowers large.

Pot Peach, see *Pecher Nain*.

Pourpree, Grosse.

Pourpree, see *Late Chevreuse*.

Pourpree Hative (*Pourpree Hative a Grandes Fleurs*, *Early Avant of some*, *Avant Rouge of some*).—Leaves crenate, with reniform glands, flowers bright rose and large, flesh melting, colour pale yellow and red, middle-sized, quality first-rate, season middle and end of August.

Pourpree Hative (of some), see *Grosse Mignonne*.

Pourpree Hative, Veritable (*Du Vin*, *Early Purple*, *True Early Purple*).—Leaves with globose glands, flowers large. Probably nothing different from the *Grosse Mignonne*.

La Pourpree (*Pourpree Tardive of the French*.)

Pourpree de Normandie, see *Grosse Mignonne*.

Pourpree Tardive, see Late Purple.

President.—Leaves crenate, with globose glands, flowers deep red and small, flesh melting, colour pale yellowish green and red, size large, quality indifferent, season middle and end of September. Inferior to the late Admirable. An American peach, requiring a S. wall.

Purple Hative (of some), see Grosse Mignonne.

Rambouillet (Rumbullion).—Leaves crenate, flowers large, fruit middle-sized, flesh bright yellow, melting, quality good, ripe mid-September.

Rare Ripe, Early Yellow (Yellow Rare Ripe).—Leaves with reniform glands, flowers small, flesh melting, colour yellow and red, season end of August, flesh yellow.

Rare Ripe, White Luscious.—Leaves with reniform glands, flowers small, flesh melting, colour pale green and red, middle-sized, quality indifferent, season middle of September.

Rickett's, see Twyford.

Ronde de Vallabreques.

Rosanna (Petite Rosanne, Alberge Jaune, Pêche-Jaune, Saint Laurent Jaune).—Leaves crenate, with reniform glands, flowers pale red and small, flesh melting, colour yellow and darkish red, middle-sized, quality indifferent, season mid-September, flesh yellow, bears as a standard in a good season and situation.

Rouge, Paysanne, see Madeleine de Courson.

Royal, see Late Admirable.

La Royale, see Late Admirable and Grosse Mignonne.

Royal Charlotte (Early Purple of Kew, Madeleine Rouge Tardive, Madeleine Rouge à Moyennes Fleurs, Madeleine à Petites Fleurs, Lord Nelson's, New Royal Charlotte, Grimwood's Royal Charlotte, Lord Fauconberg's, Lord Fauconberg's Mignonne).—Leaves doubly serrated, glandless, flowers small and pale

blush, flesh melting, colour palish green and darkish red, size large, quality first-rate, season beginning of September. An excellent sort, allied to the following; but distinguishable from it, as well as from other varieties, by its deeply and coarsely serrated leaves. Raised by R. Lowe, a nurseryman at Hampton Wick, in 1760.

Royal George (Millet's Mignonne, Red Magdalen, French Chancellor of some, Madeleine Rouge a Petites Fleurs, Lockyer's Mignonne, Griffin's Mignonne, Early Royal George, Early Bourdine of some, Double Swalsh of some, Superb).—Leaves serrated, glandless, flowers small, flesh melting, colour palish green and whitish red, season end of August and beginning of September. Excellent flavour, forces and bears well, but subject to mildew, as varieties with serrated leaves generally are.

Royal George, French, see Bellegarde.

Royal George, Grimwood's, see Grosse Mignonne.

Royal George, Grimwood's New, see *ib.*

Royal George, Mignonne (New Royal George Mignonne).—Leaves serrated, glandless; flowers dark red and small, flesh melting, colour palish yellow and red, season end of August and beginning of September; similar to Royal George. Raised by a friend of Mr. Ronald's, of Tooting, early in this century.

Royal George, Smooth-leaved, see Bellegarde.

Royal Kensington, see Grosse Mignonne.

Royal Sovereign, see *ib.*

Rumbullion, see Rambouillet.

Sachamoonah, see Mammoth.

Saint Laurent Jaune, see Rosanna.

Saint Fagus.

Sandalie Hermaphrodite, see Abricotee.

Sanguinole (Bloody, Sanguine or Blood, Betterave, Druselle).—Colour purple and red externally, that of

flesh like a beet. Used for preserves, as are also the other varieties of Sanguinole.

Sanguinole a Chair Adherente.—Leaves with reniform glands, flowers large, flesh clingstone, colour darkish red, middle-sized, season end of October.

Sanguinole, Melting.—Leaves with reniform glands, flowers large, flesh melting, size large, quality indifferent, season end of September and beginning of October.

Sanguinole, Pitmaston.—Leaves with reniform glands, flowers large, flesh melting, colour dark red, size small, season end of September.

Scarlet Anne.—Leaves serrated, glandless, flowers large.

Serrated, see Emperor of Russia.

South American, see Braddick's South American.

De Sernach.—Leaves with reniform glands, flowers large, flesh melting, colour pale yellow and red, size large, season end of September.

Spring-Grove.—Leaves crenate, with globose glands, flowers pale blush and large, flesh melting, colour pale green and red, middle-sized, quality first-rate, season end of August and beginning of September; resembles the Acton Scot. Raised by Mr. Knight from Neill's Early Purple, by the pollen of the Red Nutmeg.

Spring-Grove, Persian.—Leaves serrated, glandless, flowers large, flesh melting, colour palish green and yellow and red, middle-sized, quality indifferent, season beginning of September.

Sulhamstead.—Leaves deeply serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season end of August; very like the Noblesse. Raised at Mrs. Thoyte's, Sulhamstead House, near Reading, in 1815.

Superb, see Royal George.

Superb Royal, see Grosse Mignonne.

Swainson's, see *Swainson's Black*.

Swaleh, see *Double Swalsh*.

Swalze or Swolze, see *ib.*

Sweetwater (Early Sweetwater).—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red, middle-sized, quality indifferent, season end of August,

Teint-doux.

Teton de Venus, see *Late Admirable*.

Tonbridge.—Leaves with globose glands, flowers small, flesh clingstone, colour yellow and darkish red, middle-sized, quality indifferent, season end of September.

Transparent, see *Grosse Mignonne*.

Transparente Ronde.

Troyes, Peche de, see *Petite Mignonne*.

Twyford (Holmes's, Rickett's).—Leaves serrated, glandless, flowers large, flesh melting, colour pale green and red, size large, quality first-rate, season beginning of September; probably a seedling from *Noblesse*, which it very closely resembles.

Unique, see *Emperor of Russia*.

Vanguard, see *Noblesse*.

Velontee de Merlet, see *ib.*

Velontee Tardive, see *Nivette*.

Vin, Du, see *Veritable Pourpree Hative*.

Vineuse, see *Grosse Mignonne*.

Vineuse de Fromentin, see *ib.*

Violette Hative, (of the English,) see *Bellegarde*.

Violette Hative, French, see *ib.*

Violette Hative Grosse, see *ib.*

Washington Clingstone.—Leaves with reniform glands, flowers small, flesh clingstone, colour palish yellow and green and red, middle-sized, quality bad, season middle of September.

Wellington.

White Blossomed, see *White Blossomed Incomparable*.

Williams's Early Purple (Williams's Seedling).—Leaves serrated, glandless, flowers small, flesh melting, colour palish green and darkish red, size large, quality first-rate, season end of August. Scarcely different from *Royal Charlotte*.

Witham's Seedling.—Leaves serrated, glandless, flowers large.

SELECTIONS.

For Pot Culture and Forcing in general.—Grosse Mignonne, Noblesse, Royal George, and Bellegarde.

For Walls in Scottish Highlands.—Barrington, Bellegarde, Bourdine, Chancellor, Grosse Mignonne, Malta, Noblesse, Yellow Alberge.

For Walls in N. of England and S. of Scotland.—In addition to the foregoing, Catherine, Ford's Seedling, Late Admirable, Royal George, Smith's Newington.

For Walls in S. and Midland England.—In addition to the above, Early Anne and Madeline de Courson.

For Standards.—Rosanna and Yellow Alberge.

The best Varieties are Royal George, Bellegarde, Noblesse, Chancellor, Late Admirable, Catherine, Grosse Mignonne, Royal Charlotte and Barrington.

CHARACTERISTICS OF EXCELLENCE.

IN England, the melting peaches, the flesh of which freely leave their stones, are much preferred; but in France, the Pavies or Clingstones, of which the flesh

is closely adherent to the stone, are much more esteemed. This is not mere caprice, for the climate of France produces the Pavies in greater perfection than does that of our country.

Whether melting or clingstone, to entitle it to rank as a first-class fruit, the skin should be thin, of a deep or bright red colour next the sun, and of a yellowish cast next the wall. The flesh should be very thick, firm, of a yellowish colour, full of juice, which should be high-flavoured; and the stone small.

MODES OF PROPAGATION.

THE peach may be increased by seed, layers, budding, and grafting.

By Seed.—By this mode only varieties can be raised, as the seedlings never resemble their parent, but for the most part differ from it very widely.

Plant the stones in October or November, three inches deep, in a pot eight inches diameter, filled with light turfy soil from a rich meadow, and plunge the pot in the earth of a south border, sheltering in winter with litter or a frame. Move them into a vinery, when forcing commences, in February. The plants will be up in March, and must be kept under glass to the end of the year. Allow as many laterals to remain as can have their leaves fully exposed to the light, and shorten them, whilst very young, to the

fourth or fifth leaf. Destroy the buds in the axillæ of these leaves as they appear. The laterals, near the top of the plant, when about seven feet high, must be shortened; but the buds are not to be touched. Change the pots three times during the summer, adding fresh turf each time. The plant will probably form blossom buds the same autumn, and these may be at once used for propagating the variety. —(*Knight's Papers.*)

Hybridizing may be practised very successfully with the peach, by removing the stamens from the flowers of the female parent, and applying to their stigmas, by the aid of a camel's-hair pencil, pollen from the stamens of that which is wished to be the male parent. The *Acton Scot* and *Spring Grove* were thus obtained, the latter having for its male parent the Large French Mignon, and for its female parent the Small Red Nutmeg. The female parents were dwarfs grown in large pots; they were in vigorous health when impregnated, and only three peaches allowed to ripen on each tree. Each stone produced a different variety, of which the two above named were the best. In the above cross-breeding the principle was kept in sight, that the most excellent offspring is engendered between parents remotely related to each other.

Layers.—Mr. Knight states that peach and nectarine trees, particularly of those varieties which have

been recently obtained from seed, may be propagated readily by layers either of the summer or older wood, and even from cuttings, without artificial heat ; for such strike root freely. (*Knight's Papers*, 274.)

The layer, if the branch be not convenient for pegging down, may be obtained by circumposition ; that is, by passing it through the hole in the bottom of a small garden-pot, and filling this with light rich mould. This must be kept constantly moist ; and the pot and branch kept quite steady by tying to a firm stake. In any case the rooting is facilitated by cutting away a circle of bark just below the bud from whence the roots are wished to be emitted, and the branch should be layered at the close of July or very early in August.

Grafting.—Although we prefer budding to this mode of increasing the number of any desired variety, yet grafting is sometimes necessary. We shall take advantage of some useful directions relative to the practice from the pen of Mr. D. Cameron, gardener to Sir G. Cockburn, at Highbeach, Essex. The advice he gives concerning the stocks is also judicious and consonant with other directions we shall hereafter offer. He remarks that every gardener must have observed that the vigorous shoot made by the bud the first year, when cut down the second year to within six or eight inches of the stock, receives a severe check, and is very liable to disease. It frequently

happens that the future tree is spoiled in appearance by the weakness or unequal vigour of the side shoots, and partial decay of these, and of that part of the main stem which is above the stock. But, even under the most favourable circumstances, this mode of raising peach trees never produces handsome plants till the third year, and they seldom bear fruit till the fourth or fifth year.

As a quicker and better mode of raising trees of this kind, sow in autumn kernels of peaches, nectarines, or apricots, under the walls where they are to remain. They will make a vigorous shoot the following spring, and may either be budded in the August of the same year, or grafted the March of the year following. Grafting is the mode Mr. Cameron prefers, and the scion should have a quarter of an inch of two-years-old wood at its lower extremity. Scions so taken off succeed better than those taken indifferently from any part of the young wood. Cut the stock with a dovetail notch for the scion to rest on, and tie it on in the usual manner. Remove the buds of the scion in back and front, leaving two on each side and a leader; when these have grown six or eight inches, pinch off the extremities with the finger and thumb, by which means each shoot will throw out two others, and thus produce in autumn a fan-shaped tree, with ten branches. Generally they will bear two or three fruit the second year from the

graft, and a proportionably greater number the third year. The flavour of the fruit is superior to that from trees grafted on plum-stocks.

If budding be preferred to grafting, the shoot produced by the bud should be pinched after it has grown six or eight inches, and only five buds allowed to push; the five shoots produced by these buds should themselves be shortened to five or six inches, and disbudded as they push, so as to produce a fan of ten shoots, as in the case of the grafted tree. If the wood so produced is properly ripened, it will hardly fail to produce blossoms the following year. (*Gard. Mag.* iii. 149.)

We highly approve of Mr. Cameron's remarks in the main, although we would prefer thus preparing the plants in the kitchen garden in a temporary situation, and removing them to their permanent station at the close of the second or third year. Our objections to this portion of the plan are, that the tree would form tap-roots, or at least roots inclined to ramble a considerable depth: they should not, moreover, be allowed to occupy principal stations whilst many temporary ones can be found, and which will equally suffice. Frequent transplanting whilst young, we hold to be the only legitimate procedure by which to obtain abundance of fibrous surface roots: these being obtained, well-ripened wood will follow as a matter of course.

The mode of stopping pursued by Mr. Campbell is judicious indeed; and could our nurserymen be persuaded to adopt a similar plan, it would be of immense benefit to the purchaser. In the nurseries, the peach and nectarine are propagated by budding in July. The head of the stock is cut off in the next February, and the gross stock of course puts forth a shoot strong enough for a whip handle. This, instead of being pinched off when about six or eight inches long, is suffered to ramble some five or six feet, in order to produce a plant of a specious character, termed "a strong maiden." Who can wonder that the large wounds which must occur in thus heading back should have a continual tendency to gum? Indeed, we have no hesitation in saying, that the seeds of premature decay are deposited at this very period; the evil being greater in proportion to the gross and showy character of the maiden plant.

A great objection to grafting is its being more uncertain than budding, owing to the excessive flow of sap or gum from the wound. Dr. Page, of Albany, in the United States, has obviated this by his mode of treatment. He says that the peach tree is of more rapid growth than any of the other American orchard trees, and frequently, in congenial soils, the first year from the seed, attains the height of six feet, with stems from one inch to one inch and a half diameter. The circulation, of course, must be very

active, and the sudden check from heading down such a tree, will in many cases destroy it. But should it live, the roots continuing in a state of activity, the scion is overflowing, as it were, by the sap; that is, the sap flows so fast from the wounds, as to prevent the process of granulation, by which the scion is united to the stock. To graduate, then, the supply of sap to the wants of the scion, is the primary object; and the measures necessary to secure this condition are just those which tend to preserve the life of the stock after heading down. In the middle of July, Dr. Page selected the scions from thirty trees, with four or five eyes, taking care to choose those which contained leaf-buds. The stocks chosen were moderately-growing instead of thrifty stocks, and were trees of the growth of that season from the seed. Before heading down, he passed a long sharp knife down entirely round the tree, and severed all the lateral roots at the distance of three or four inches from the trunk, according to its growth. This done, the trees were headed down at a point where the stem was just the size of the scion, or a little larger, as the scions were inserted a little on one side of the pith. The insertions were made in the ordinary way of cleft-grafting. The scions were then secured by a narrow strip of sheet lead, wound spirally over the whole length of the cleft, and a small ball of grafting clay put over the whole. Every scion inserted in

this way grew off finely. When heading down the stocks, he took care in every case to leave either one or two small shoots, some leaves, or several nascent buds, in order to continue all the functions of the tree until union had taken place between the scion and the stock. As soon as the buds of the scion began to put forth, all below upon the stock were pruned off. When the scions were taken from the trees, the leaves were all removed as in budding, leaving only a small portion of the footstalk. The clay and ligatures were removed in the autumn, when vegetation had ceased, and the wounds were all well closed. (*Albany Cultivator.*)

Budding.—Much of the future success of any tree depends upon the judicious choice of the bud from which it is raised. It should be taken from a healthy tree, that for some years has proved itself a good bearer of well-flavoured fruit. Do not take the bud from one of the most gross-growing shoots, but from one the wood of which is well ripened, and its buds close together. From these select the largest and plumpest. Such buds will not make very strong shoots the first year or two, but they will make healthy and good bearing trees. Bud the peach in the evening, or during cloudy weather, and in July or August; though we shall see presently that budding may be performed successfully in October and even November.

We would advise that the buds be selected from

towards the extremities of the main shoots ; such will be found in general sound and of a fruitful tendency, although they may appear of a somewhat robust character.

It is a common practice to insert one bud only in each stock, in its side, and about six inches above the soil. There will be no harm, however, in inserting two ; for an extra chance will be hereby secured. Moreover, in pursuance of the course recommended by Mr. Cameron, as previously quoted, the two buds opposite to each other being successful, will (if pinched or stopped according to his practice) produce two or three shoots each wherewith to form the principal arms of the future tree. By this mode, we confess, the centre of the tree for a season will appear unfurnished. We, however, prefer furnishing the centre of the peach from shoots of a secondary character, which, if the tree be healthy, will readily fill the centre from the side limbs or shoots.

After the budded trees have ripened their first year's shoots, they may be planted, either where they are to remain, or be trained in the nursery for two or more years until in a bearing state. Whichever plan is pursued, the first shoot, if it has grown unstopped, must be headed down in the March following, to produce lateral shoots, and a leader, to begin the fan-form training of the head, or according to any other mode that will be detailed in the sub-section "TRAINING."

Choice of Stocks.—We prefer for all situations peach-stocks raised from stones sown either where the plants they produce may remain until after they are budded and had their first training ; or, which is better, sown beneath the wall against which the buds they have been inoculated with have their branches trained.

The experiments of Mr. W. Anderson, in the Botanical Garden at Chelsea (*Gard. Mag.* i. 384), and others of which we have a record, shew that the peach budded on an almond-stock is short-lived.

The Damask plum and the Greengage are often used as stocks for the peach, but we have found that, on an average, the trees are neither so healthy nor so fruitful as others budded on peach-stocks.

In Scotland, where the severity of the climate almost precludes any hope of cultivating the peach tree out of doors with regular success, Mr. M'Murtrie, gardener at Shuckborough Gardens, recommends, as the apricot succeeds very well in some situations, a few peach-buds to be inserted into those trees. In 1824, he inserted a quantity of buds, which took readily, and the next season made fine strong healthy wood ; and, in 1826 and 1827, they produced fruit far superior to that on the peach trees. (*Caled. Hort. Mem.* iv. 367.)

We have already stated that we prefer the peach stock to any other, but there are some good authori-

ties who use other stocks, and vary these according to the soil on which the trees are grown. Thus the Montreuil orchardists, near Paris, so famous for their peaches, employ almond-stocks on soils sandy or chalky, and plum-stocks where the soil is clayey. Mr. Knight, we think, inclined to the use of almond-stocks for the nectarine; and adds, as a warning, that as they do not transplant well, they should be grown in pots.

Mr. J. Smith, gardener at Hopetown Gardens, N. B., has made the following observations upon this subject:—

The adaptation of stocks to soils has not been sufficiently studied in this country. In France, the peach is budded on almonds in dry situations; while such as are destined for heavy loams are inserted on plums. It may also be noticed, that the French seldom venture peach trees on such clayey soils as we not unfrequently do.

Instead of budding the tree on the spot on which it is to grow, or transplanting it when, in technical phraseology, it is a maiden, that is one year old, we, in our impatience, have recourse to trees which have been trained in the nurseries. Such plants, by a rigorous application of the knife, are made to produce an abundance of showy wood, and, at the same time, are so circumscribed that they do not cover half as much wall as the French trees of the same age. The

vegetable energy, thus confined within a narrow space, is ready to burst forth in whatever irregular manner chance may determine. The principle members, which form the skeleton of the tree, are seldom sufficiently distinguished from the other branches. Taking their origin chiefly from the centre of the tree, they become too crowded, and they are further allowed to separate into an indefinite number of subdivisions. This defective arrangement, in general, and especially when combined with the foregoing circumstances, fails not to overthrow the equilibrium of the sap.

Again, there is a want of distinction between the subordinate members and the bearing shoots. The latter too frequently pass into the former, and then, in the confusion which follows, amputation either of larger or smaller branches becomes necessary. This pernicious operation is quite indispensable in those methods of pruning recommended by Mr. Knight and others, in which reversing and bending of the bearing shoots are prominent features. (*Cal. Hort. Mem.* iv. 155.)

Although Mr. Knight inclined to almond-stocks for the nectarine, he preferred peach-stocks for the peach, and gives the following directions for their raising. Instead of sowing the stones in pots as directed when varieties are the object, sow them in the border three inches deep, twelve inches apart, and in rows two feet asunder.

The plants will spring up in April, and in August and September will be of proper age and size to be budded about two inches from the ground. The nurseryman, therefore, will have the advantage of taking his buds from the trees whilst the fruit is upon them ; and he can, in consequence, easily guard against errors which much too frequently occur, and he may feel quite certain that none of his buds will break prematurely. Buds may be inserted in the early part of October ; and Mr. Knight introduced some with perfect success even in November. Late in the autumn he generally shortened the roots, which descend perpendicularly into the soil, by introducing a spade into the ground on two sides of each plant, but without moving it, or further disturbing its roots. Thus managed the buds shoot very freely, and with proper attention to preserve their fibrous roots, and to pack them properly, they may be sent to the most distant part of the island without danger of their being killed by their removal. Older trees, possibly, cannot be removed without danger of their failing ; but Mr. Knight transplanted a peach tree, in the autumn, of ten years old, which was growing upon its own roots, and was more than ten feet high ; and in the following spring, it emitted its blossoms as freely as those trees which had not been transplanted—its roots, however, were well preserved, and its branches properly retrenched. (*Knight's Papers*, 274.)

We may observe, as to the choice of stocks, that the main art of peach and nectarine cultivation does not lie here in quite so high a degree as some persons imagine. Not that all stocks are alike ; for much, very much, difference exists in this respect. It must be well known to many of our readers that peaches have been most frequently cultivated with the highest possible amount of success on the ordinary plum-stock ; and this merely by a proper adaptation of soils, together with extreme care in keeping down insects, and some other important points, of which more in their proper place.

Although it may appear somewhat egotistical, we may perhaps be pardoned for mentioning that we carried the Knightian medal at the July show, at Chiswick, this year, against all competitors, by peaches from a Bellegarde, budded on an ordinary plum-stock. The tree, moreover, has only been planted two years, being moved from the open wall, where it covered an area of 100 feet at the period of removal. Five of the peaches exhibited weighed $52\frac{3}{4}$ ozs., thus averaging nearly 11 ozs. each. We question whether this weight, for five together, has ever been exceeded. The stock, as before observed, is the ordinary plum-stock.

It is the practice of the nurseries, we believe, to use what is termed the Mussell plum-stock for this purpose, at least for the common English peaches,

These are grown, or at least used to be, in great quantities in the lower part of Surrey, in what are called "stock nurseries," purposely for the trade. The finer French peaches, however, in our younger days, were worked on a stock of more delicate habits, known by the name of the pear-plum-stock. This stock was a substitute for twice working, which was in somewhat general practice about fifty or sixty years since. The course then pursued was to bud the common plum-stocks with some gross or robust kind of peach, as the Royal George, and then to bud the delicate kinds of French peaches on this stronger kind.

Whatever kind of stock be used, we would systematically transplant them twice before they were budded, and once afterwards. We hold that abundance of surface roots on undug borders are the best guarantee of permanent success. Indeed, we conceive the essential difference between the employment of common plum-stocks and those of the almond, or from the peach kernel, lies in the different character of the roots, together with the comparative ratio at which the ascending sap is furnished—the plum being more inclined to tap roots; and unless somewhat tamed by a preparatory course, liable to surcharge the system of the tree with fluids. It should not be forgotten, moreover, that the deeper root of the plum creates a tendency to late growth in the

peach, which, we need scarcely say, is of a watery and immature character. We will offer more observations on this subject under the head "border-making."

SOIL AND MANURES.

THERE are two most essential points to be attended to in the borders where the peach is grown ; so essential, indeed, that, if not sufficiently provided for, the trees grown upon them will never be productive, for they will have gross ill-ripened shoots, and diseased, blistered leaves. The essential points alluded to are complete drainage, and avoiding the employment of rich animal and vegetable manures.

The following directions embrace both a good system of drainage, and the preparation of a soil most suitable for this tree.

Nine inches of flints, stones, or brickbats, with under-drains to carry off the water, will accomplish the drainage of a peach border ; on this lay 18 inches of mellow loam, of a turfy nature, from a dry healthy old pasture, without any manure, and the border is complete. This arrangement, like all others in good gardening, is without mystery, and when carried out, inexpensive in most places. One of the most important points in peach-growing is to get bearing-wood. The border has a great deal to do with this, for when

manure is liberally supplied to the border, or when the roots have a superabundance of moisture, caused by imperfect drainage, the shoots under such circumstances are not of that quality which gardeners distinguish as short well-ripened bearing-wood. (*Gard. Chron.* 1845, 512.)

The most important affair is to select a good loam ; and although some of our continental neighbours seem to prefer a light soil, the majority of good English peach-growers like a sound loam. The term sound loam is, we acknowledge, of a somewhat indefinite character, and it is not very easy to convey a just notion of what we mean by it.

Loams differ much in colour as well as texture ; we do not, however, conceive that colour is of very great importance, although we must confess that we prefer a bright loam of a yellowish cast. We like it to be slightly adhesive, not however clayey. The more the clayey principle predominates, the shallower the border should be ; and, as a general principle, we advocate rather shallow borders ; two feet we think amply sufficient, especially in the northern counties. We have grown first-rate peaches and nectarines on borders not more than sixteen inches in depth, but then there was no cropping carried on, which could by any means interfere with the surface roots ; and top-dressing was resorted to, as indeed it must be in such cases during the heat of the summer. This

depth, then, we would recommend especially for our northern counties ; for, after all, ripening the wood is the grand leading principle, without which all other appliances will be neutralised. Hot and dry summers are the exception, not the rule, in England ; and the above depth we think provides best for the average of seasons.

It is comparatively easy to apply water when needed ; not so easy to remove it in soils of great depth and in rainy seasons. There is no great difficulty in applying three or four barrowsfull of manure as top-dressing, during unusually hot periods ; much difficulty, however, exists in checking a tendency to late and immature growths, when trees are planted in deep and rich soils—especially during a damp and dark summer, closed by a showery autumn. A good sound loam, therefore, little more than half a yard in depth, will, we think, best suit the majority of cases. As, however, trees are very differently circumstanced when planted inside the peach-house, we shall make our remarks more serviceable by detailing the style of border best adapted for the forcing-house, as also that for the out-doors wall. Hot walls will also require a separate notice, and we proceed to offer practical points on each respectively.

Mode of Preparing Borders out of doors.—To determine on a proper level is the most important principle from which to start. If the ground is in a low

district, and naturally of an adhesive character, one half the volume of the border should be above the ordinary ground level. The most perfect drainage in such cases must precede all other operations ; without this the whole must ultimately prove a failure. In ordinary cases, and where no particular suspicion rests as to the retention of water, one bold main drain, communicating with the porous substratum (and placed one-half of its depth below the level of that body), will suffice. If, however, the ground is naturally damp, cross drains must be had recourse to ; their frequency corresponding with the amount of water to be drawn. In general, such cross drains may be placed about fifteen or twenty feet apart.

Much has been written about impervious bottoms of concrete, &c. ; we, however, are decidedly opposed to them. They are, at the best, doubtful on the score of principle, and decidedly objectionable on the score of expense. They moreover serve to render a matter, perfectly simple in itself, complicated ; and may serve to deter many persons from attempting the cultivation of this luscious fruit, which is certainly within reach of all who can command a wall, and can bestow a little attention occasionally.

The under-drains being established, the next thing is to place a considerable body of any broken, porous, and imperishable material over such drainage. Broken bricks, stones, or scoriaceous matter is the sort of

thing ; and this should, in ordinary cases, be laid at least eight inches deep ; in extraordinary cases of wetness, or in our more northern counties, the deeper the better. Such having been spread to a fair and even surface, means must be taken to prevent the soil from entering the surface. We find nothing superior to clean-riddled cinders, sweeping them into every crevice, and working them to a very even surface, over which a roller may be finally passed.

Our practice is to place a layer of thick turves immediately on this, with the grass side downwards. These turves should be from a very old pasture if possible, and possess a vast amount of fibrous matter. Our loam being at hand, we proceed by throwing on alternately a layer of loam and a layer of fresh stable-door litter ; introducing the latter in very thin portions, shaking it out with a fork. We also occasionally sprinkle in a few of the fallen oak or beech leaves recently raked from the Park ; our object being to keep the soil elastic for a long period, and rather to add organic matter than stimulating manures.

These operations should always be performed during a dry period ; and those who intend doing full justice to a peach border, should have every thing in readiness by the end of August, in order to take choice of weather between that period and the planting time.

No loams can ever be relied on if handled in a wet state ; such a proceeding will nullify the best laid

plans. We may here add, that we highly approve of a sprinkling of bones, crushed to what is termed in the market, "half-inch bone." Such may be mixed with crushed charcoal, and introduced rather liberally; we would say, one part of the bone to three parts of the charcoal, and as much of the two as would cover the face of the border three inches in thickness. Where such is introduced, however, the border should be made three or four inches deeper.

Mode of Preparing Borders in-doors.—We need say little on this head; the principal difference will be in point of depth. Peaches and nectarines in-doors have to endure a greater amount of ground heat, as well as atmospheric, on the average; a much greater demand therefore exists on the system of the tree. We also advise a more liberal application of manure; and good stable manure, in a fresh state, may be introduced in the proportion of one part to six; besides a small proportion of the stable litter, as recommended for the out-door borders. The loam, moreover, should, if possible, be somewhat sounder still; avoiding, however, every thing of a clayey character. We make our in-door borders a yard in depth, taking care that the bottom is rendered perfectly safe from the effects of stagnant waters. The bone and charcoal may be introduced here as in the out-door borders, and the filling-in accomplished in a similar way.

Mode of Preparing Borders for Flued Walls.—

Here again, as the trees will be subjected to a somewhat greater amount of heat in the aggregate, we would make the border a little deeper than for ordinary walls. The whole of the process here, in fact, may be exactly intermediate between the course recommended for the house border and that of the open wall.

Before closing with the subject of border-making, it will be well to observe, that the more turf the loam contains the better ; and that from very old rest-land is by all means to be preferred. It may be dug or cut from two to six inches deep, according to the designs of the proprietor, and one rough chopping will suffice ; it must by no means be broken fine. Lumps of solid turf, in masses, four or five inches in thickness, should prevail through the whole mass.

If a soil is a friable loam, but deficient in decomposing organic matter, the best compost which can be employed is a mixture of bone-dust and decayed leaves, in the proportions of two parts of the latter to one of the former.

AS A STANDARD.

The Hardy Morton Peach was raised from a stone of a fruit which was gathered in the garden of J. Morton, Esq., Rehoboth, near Dublin. Throughout its growth it was exposed to all the vicissitudes of our climate, and was the hardiest variety we were ac-

quainted with. It was planted in an open border which ranges north-west and south-east, for the purpose of training it as an espalier, hoping that its initiation to our climate would render its habits more suited to a productive growth than those which have been fostered in houses or against walls. The result realised those hopes ; its growth was too vigorous to bear the restraint of an espalier form, and therefore, in preference to employing that usually prejudicial, and, at least, temporary remedy of over-luxuriance, reducing the number of the roots, the centre branch was trained as a standard, and the two side limbs as an espalier. It grew most luxuriantly, and the second year it bore thirty-five peaches, five of which were on the standard branch, and scarcely at all later in their ripening than those on the trained branches. The tree stood on a declivity sloping to the south.

Having left the house in the garden of which this tree was grown, it was neglected and died ; but we believe that buds were taken from it, and, if so, it will be found the hardiest of our varieties. The outer skin of the fruit was very unusually thick.

The Rosanna, and probably some of our other early-ripening varieties, will ripen their fruit as standards, if grown in a favourable situation, such as on a soil sloping to the south, or south-east, and sheltered from the other colder points of the compass, as well as from the westerly winds.

If so planted on a well-drained soil, and allowed to grow unchecked, it would require little other pruning than removing such branches as incommoded others. We would remark, however, that, if an attempt be made to carry out this mode of cultivation, the soil should be a fresh maiden loam, and by no means deep. In the northern counties we would also elevate the site of the tree a foot above the ordinary level, enclosing the soil by turves or by stones. Richness of soil would, in this case, never produce short-jointed wood, without obtaining which all the labour bestowed would be fruitless. Whatever mode of training might be adopted, the shoots should be kept thinly pruned, and liberally disbudded.

WALL CULTURE.

The Border for peach trees need not have more than a foot's depth of soil, nor be wider than six feet; but 18 inches deep and eight feet wide is the best allowance. Whatever be the dimensions, good drainage, as urged in a previous section, is of absolute importance.

Mr. A. Cramb, gardener at Heywood House, Wiltshire, is in favour of the smaller dimensions, observ-

ing that a border of six feet wide, and one foot deep, is sufficient to support trees luxuriantly. Those who grow peach trees in pots have an evidence of this from the small quantity of soil which is required to maintain them in vigour. When manure is wanted, it can be given in a liquid form, and in such quantities as the cultivator may think proper. A breadth of border is preferable to a depth of soil. The roots in the former situation will ramify under the influence of solar heat, and the nutritious gases of the atmosphere, which give flavour to the fruit and stability to the wood. As a covering for shallow borders, decayed tan is a very suitable material. It always presents a clean appearance, and is a great absorber of heat. (*Gard. Journ.* 1846, 60.)

It ought to be kept in mind that if the border is very shallow no cropping must be permitted over the roots, or at least none that requires a spade. A very sound loam also should be used for making the border, or the trees will be liable to suffer in hot periods. Mr. Cramb's advice is very good on the whole: we do not, however, like the old tan, unless it is removed when getting much decayed. We would rather cover with rotten farm-yard manure, which is never too stimulating on the surface, providing nothing but sound loam has been used in making the border, and that the border is free from the lodgment of water.

The drainage should be effected by draining tiles ;

and we quite agree with Mr. Marnock in deprecating the practice of paving or concreting between the border-soil and the subsoil. Wherever the bottom is so constructed as to resist the passage of moisture, either upwards or downwards, we think the surface, in like manner, ought to be shielded from the falling rains. We had almost said that nothing could be more unphilosophical than to lay the border earth on an impervious stone floor, which must of necessity retain every drop of rain water that falls upon it. It is true it may filter towards the front and escape ; but what an excess of moisture there must continually be towards the lower part of the border ; certainly quite enough, for at least nine months in the year, to keep six or nine inches of the lower portion of the border completely saturated with wet ; and more than enough to rot half the roots of the trees, which annually send their roots downwards. (*Gard. Journ.* 1846, 501.)

These remarks of Mr. Marnock are indeed most judicious, and the idea of making impervious bottoms cannot, in our opinion, be too much repudiated. It does, indeed, appear strange, that whilst the agriculturist is so anxious to remove the hard pan from beneath his soil, which exists in some localities, and whilst the benefits of a thorough aration by subsoiling or otherwise are generally recognised, that gardeners

should be found backing so disputable a point. It does, indeed, to us, appear a retrograde course; for surely the roots may be kept up, and the passage of the water facilitated, without recourse to such expensive and doubtful processes.

In establishing a peach border, in which, as before observed, draining is of paramount importance, providing waters lodge, the character of both soil and subsoil must be taken into consideration. We have known situations where no drainage whatever is necessary. Indeed, such is the case with the borders under our own management. Our trees are planted on platforms composed of broken bricks or stone, which reach about two yards from the centre of the tree each way. The subsoil beneath is of common red sand, several feet in depth, and quite dry. We have grown first-rate peaches on such borders for nearly twenty years without a single drain. The majority of soils, however, require some drainage, and for this purpose we would recommend a deep and capacious receiving drain along the front of the border, and parallel with the wall, and cross drains running rather diagonally into the main. The frequency of the latter must be regulated by the amount of suspicion as to wet. These drains must be well secured at the top, and should carry a superstratum of broken and imperishable material, from three to six inches thick at least, in order to secure the surface from the

percolations of the superincumbent border. We lay a layer of thick turves on this, merely sweeping some fine gravel or cinders in the interstices of the turves.

Walls.—These must not be less than nine inches thick, otherwise they will cool so quickly as not to forward the ripening of the fruit and wood so rapidly as is desirable. They are quite as efficient in this respect, if not more so, when built nine inches wide, but hollow. They should have a far projecting coping on the top, for this not only checks the radiation of heat from the wall, but is a protection from strong wind and heavy rains, which are especially liable to injure the blossoms. Moreover, they facilitate the use of netting, &c., as will be more fully particularized in the section devoted to “Shelters.”

Another most important point is the quarter of the compass the wall should face. A south-east aspect is decidedly preferable to a south-west one for peaches. If, however, the border is not too wet, and if the trees are properly trained, they ought to succeed very well on a south-west aspect. The heavy rains to which they are then exposed are injurious when they occur in the blossoming season ; but if the border is sufficiently permeable, the rain, always comparatively warm from that quarter, is beneficial, and far preferable to artificial watering. The vigour of shoots produced on this aspect is generally such as to require them to be trained in a direction nearly horizontal ; and when so

trained, an abundance of large fruit is generally the consequence ; but if allowed to grow upright, or nearly so, few or no fruit is produced. (*Gard. Chron.* 1841, 689.)

We would here remark that, although in the southern counties the peach will ripen tolerably well on a south-east aspect, yet north of Birmingham, which is, we believe, near the centre of England, south aspects must be had recourse to in order to ensure success. Indeed, when we get as far north as the county of Northumberland, and on the borders, flued walls are considered necessary. In the counties of Cheshire and Lancashire the peach is produced in pretty good perfection without the aid of flued walls, in most seasons. Several walls of this character are, however, to be found in those counties, and the superiority of such is manifest.

It is well to have, even in some of the northern counties, a late kind or two to carry out the peach in long succession ; such as the Late Admirable amongst the peaches, and the Elruge or Newington amongst the nectarines. These, when successful, will produce fruit, which will be most acceptable, up to the middle of October. For such, a south-east aspect would be admirable. The soil, however, should not be deep, or the trees will run too much to wood, which will defeat the end in view.

Flued Walls.—To advance the ripening of peaches

during ungenial summers in any part of England, and to enable them to be ripened at all in the open air of some districts, flued walls are requisite. It must be borne in mind, however, that little firing should be applied in the early part of the season, the object being not to force forward the blossoming of the trees in spring, but to accelerate the ripening of the fruit and wood in autumn.* The maturation of the wood may, in some cases, require the border to be thatched to throw off heavy rains, and lessen the flow of moisture to the shoots. Thorough draining, however, with the use of maiden loams unmanured, and rather shallow planting, in general will be sufficient without this thatching.

The following directions are given by Mr. W. Irving, gardener to Sir J. C. Swinburn, of Capheaton, N.B., and though the early use of heat is most suited for that northern climate, yet the other treatment may be adopted in any latitude. His flued walls are built in the common way, twelve feet high, with three turns, or levels, of flues, forty feet each in length, with a handsome trellis the height of the first flue, to save the trees from being scorched by the heat of the fire: this allows of more fire without hurting the trees.

* As far north as Scotland, it is found desirable to hasten the blossom by lighting the fires earlier, and to continue them occasionally whilst the trees are blossoming.

The borders are composed of eighteen inches of the natural soil, which is strong clay, and eighteen inches of light soil from the fields, over a bottom of six inches of stones and lime-rubbish, all beat and smoothed together; the manure employed is stable-dung, soot, and vegetable mould. As soon as a tree comes into a bearing state, it will bear in whatever position the branches are laid, providing they have proper space to ripen their wood, which they ought at all times to have.

Pruning.—Unnail most of the tree, and cut out all the wood that is most worn out by last year's crop. Shorten such shoots as are wanted for new wood, and such as have not ripened their shoots to the point. All that have ripened their shoots to the point, lay in at full length, allowing them a proper distance, which adds greatly to the health and vigour of the tree, and likewise to the size and flavour of the fruit. Then nail them all neatly to the wall, with new shreds; save all the old shreds, and boil them, and lay them aside for summer nailing. When all is finished, wash the trees and walls all over with the following wash:—2 lbs. flowers of sulphur, 1 lb. soft-soap, and a few pints of soft-water. Boil the mixture slowly for some time, to promote the combination of the materials; take a tub (which should be kept for the purpose), fill it nearly full of soapsuds, and then put in a tolerable quantity of the boiled mixture, making

all milk-warm. Beginning at the one end of the wall, wash every part of the trees and wall by the aid of a syringe; standing before the wall, so that the liquid may rebound on the back part of the tree, and enter the nail-holes and every crevice in the wall. It is proper to stir the liquid all the time of washing, to keep the sulphur mixed, otherwise it will settle to the bottom; this wash becomes like a varnish on the trees. As soon as the sun shines on the trees and wall, the sulphur smells so strong that it clears all the insects from the trees and wall; the soap prevents the sulphur from being washed off the trees readily. Wash frequently with soft-water, and sometimes with soap-suds, but not when the trees are tender, nor when the fruit is swelling, as it would taint the fruit. The winter is the best time for washing with soapsuds. When the flowers begin to open, put on a canvass shelter; pull it up at night, and let it down all the day, except when the weather is wet or cold; in such weather let the canvass remain all day upon the trees. Light fires every night in the evening, from the time the flower begins to open until the fruit is all stoned. Peaches and nectarines set best in a moderate heat, with plenty of fresh air. As soon as the weather is fine remove all the covering and fire-heat. Never again light a fire, unless at the time of the fruit ripening, and then only when the weather is wet; for the sun at that time is strong, and the fire-heat stops the

dew from falling on the fruit ; but moderate dew adds to the flavour of it. As soon as the fruit is all off, wash the trees with soapsuds, and if the wood is not ripened, light fires to ripen it.

The canvass screens, employed by Mr. Irving, are made very neatly ; they are all joined together with a wall-plate at top, and another at bottom, and the rafters are mortised into them ; these rest on spikes of wood driven into the border, and the sheets are lashed to small beams at top and bottom. They are twenty feet long, draw up with pulleys, and are lashed together with small cord, which makes a handsome cover, almost as good as glass. (*Caled. Hort. Mem.* iv. 446.)

Mr. Irving's remarks, although no doubt founded on practice, contain a few points which may tend to mislead, and we beg to qualify them with a few practical remarks. In the first place, we would suggest, in the construction of flued walls, that the lower tier of flue be placed as low as possible, in order to warm the earth in contact with the roots. The utility of bottom-heat is becoming every day more manifest, and it is but a common-sense matter that the root be made to keep pace with the branches. In the second place, we would, if possible, dispense with the trellis. It is well known that a trellis is a waster of heat, or, in other words, by the author's own shewing, the use of the trellis permits a greater amount of fire-heat.

This is a thing to be avoided, for, in districts where coal is dear, it becomes a grave consideration how to economise in the consumption of this useful material. If the flue takes its first course along the bottom of the wall, the heat of course will be strongest there, but surely it would be better to place some non-conducting material in contact with that portion of the flue, which, if properly managed, would supersede the necessity of the trellis ; the best substance with which we are acquainted for this purpose is dry and new sawdust. An objection may here, however, be started, that this in the neighbourhood of the fire would be liable to ignite. Here, then, for a short space, some other substance might be used ; and pounded glass, the refuse of the glass-house, would perhaps answer the purpose. If we mistake not, this material was employed by Mr. Forrest some years since in the houses at Syon, where, we believe, the main piping from the steam apparatus, which had to travel some distance before branching into the respective houses, was imbedded in pounded glass. The next point in Mr. Irving's practice, to which we would allude, is the depth of soil he deems necessary. Three feet of soil may do in our southern counties, but will oftener produce failure than success in our more northern ones. Half a yard of this depth, moreover, is composed of strong clay ! Surely this is not to be recommended for general practice. Although peach

trees may succeed for a few years in so tenacious a compost, we should much doubt their permanency. We would rather advise two feet maximum of a good sound yet mellow loam.

Again, as to the wash recommended for dressing the trees after pruning and nailing. We approve of the articles used much, but we must be permitted to doubt the propriety of using so great an amount of soft soap. We would certainly advise persons about to experiment in this way to begin at one-half the strength as far as regards the soap ; the sulphur will do no harm. Moreover, Mr. Irving is rather indefinite as to the quantity of each article : “ A few pints of soft water ” is liable to a varied construction. “ A tub filled nearly full of soapsuds,” too. He should have stated the size.

Choice of Plants.—This is of very considerable importance, for if the buds from which their heads were formed were not taken from well-ripened bearing wood, they will not be either very fruitful or long-lived. The stocks are also of first consideration, but this has been fully considered in the section on “ PROPAGATION.” The following judicious observations on the choice of plants are made by Mr. J. Haythorn, of Wollaton Gardens :—

Maiden plants should always be chosen, as they may be trained in any way the purchaser pleases. The stock should have a clear stem, with but few

knots in it, or it will never swell out well ; and it ought to be budded from 3 feet to $3\frac{1}{2}$ feet high, according to the height of the wall against which the tree is to be placed ; if budded lower, those branches near the ground become covered in the winter with wet and dirt, which causes the bark to crack and the branches to decay. If the tree is budded high enough the branches will radiate in every direction, and those that descend will be as fruitful as those that are horizontal or perpendicular ; and no part of the wood will suffer excepting the ends of the descending branches, which may be shortened during the winter-pruning, and they will again fill the wall the following season. (*Gard. Chron.* 1841, 166.)

We must here remark that we cannot conceive the plan adopted in the nurseries to be the best for obtaining long-lived trees. The buds, for the most part, are obtained from gross, young and watery shoots ; and this, generation after generation ; the object being to obtain showy trees, which generally sell the best. We would therefore advise, in the choice of trees from the nursery, not to be guided by mere strength, however specious it may appear, but to select those which are high-coloured in the bark, short-jointed, and with an equal division of strength on each side of the tree ; preferring those which possess strong shoots, as the lower arms with a centre of rather subordinate strength. Not a single blemish should exist on any part of

the main branches or the stock. We should, nevertheless, prefer good dwarfs to the half-standards of Mr. Haythorn; we certainly have seen such trees answer admirably, but we must question the comparative durability of down-trained branches in the peach.

Planting.—If the plants are not budded on the stocks where they are to remain, which is the best mode, then select plants that have been budded three or four years, and remove them to their destination so soon as their leaves begin to fall at the end of October. Plant them 16 feet apart at the least, with the roots nine inches below the surface, and carefully arranged, so as to cover the greatest space possible. Let the stem be full three inches from the bottom of the wall, and inclining towards it. Nail the branches to the wall, but do not prune them until the end of November, when a patch of white lead should be instantly applied to the cut, in order to keep out air and moisture. The neglect of this precaution from the earliest stages of the tree's growth is, we are assured, the cause of the premature decay of the majority of peaches. This, we are persuaded, is the chief, if not the sole, cause of that discoloration in the wood which is often witnessed, and which is a sure precursor of a general breaking-up of the constitution. In nailing the branches of newly-planted trees, let very capacious shreds be used, for the soil, being newly-prepared, will settle considerably, and by

so doing, not unfrequently leaves the tree suspended by its fastenings.

Pruning.—We now come to the department of peach-culture on which there is some difference of opinion ; but we shall, as in other instances, consider, first, what is the object to be kept in view during the operation, and shall conclude by detailing the various modes suggested, with such observations as practice has suggested to us.

As the peach bears principally on shoots one year old, the object for the gardener to aim at, is to obtain annually a sufficient supply of these regularly distributed over all the branches of each tree. To do this the sap must be uniformly supplied to them. The shoots must be of moderate size, short-jointed, and well-ripened ; which is never the case with very robust, over-vigorous shoots. It is here, as is truly observed by Mr. J. Newington, that too many cultivators of the peach commit a fatal error, for they endeavour to procure annually a great supply of long and strong wood, sufficiently large to make basket-rods, and from these they expect a crop ; but nothing can be more unnatural or erroneous than this system of pruning. Whoever has seen the peach trees in Malta or America, and noticed the very short and small wood from which such large peaches are produced, would immediately condemn the above-noticed erroneous practice. Mr. Harrison, the eminent gar-

dener at Wortley, succeeded well with a bad system of pruning, by shortening his shoots severely ; but his garden lay extremely exposed to the winds, which are beneficial in moderating the luxuriance of growth of plants, and such situations are not as liable to chilly damps and blights as low and more sheltered places. The man who has cultivated the peach tree for some time must have observed that the branches which have lost their leading buds never fail to set their fruit well, and often for a long time continue to swell such fruit faster than branches that are crowned with luxuriant leading shoots. This may be accounted for by the ascending sap being carried forward by the luxuriant growth above, and thus depriving or carrying away from the fruit its natural juice ; they then wither and fall off. (*Gard. Mag.* vi. 55.)

In conformity with the principles we have noticed as just, we have the following general rules for pruning the peach, laid down by Mr. J. Craig, gardener to G. Cholmondley, Esq., of Howsham, Yorkshire.

If it is taken for granted that the most suitable wood for producing fruit is short-jointed and stiff (say from one-eighth to three-sixteenths of an inch in diameter), it remains to be considered how a regular supply of that wood is to be obtained, so far as pruning, &c., may effect it, where the soil and situation are not favourable for it on trees that have been some time established. In this case, transplantation, where

the trees are not too old, may be most judiciously resorted to for once; not so much for the purpose of the immediate checking of the tree as for repairing the substratum, and reducing the strength of the border by adding sand, &c. Were it possible to avoid it, do not let one of the fibres be damaged, more than their being necessarily out of their element for a few hours would cause. This would check the tree sufficiently for one year; and, in future, it would remain moderate, in consequence of the arrangements in the border, and the pruning to be adopted. Do not reckon upon a full crop of fruit the first year; because, if the young branches were generally luxuriant, it is probable they would not set much fruit; and, on any part that might be weak, do not allow any fruit to remain. In pruning, leave the branches thin, and shorten those which were vigorous to about two-thirds of their natural length, and those that were weak to one-third. In summer pruning, leave no more shoots than you calculate upon wanting in the ensuing spring, except where the branches were luxuriant; there leave rather more, according to vigour. Where a young shoot is luxuriant, stop it, and take off the superabundant shoots before autumn; by which, those shoots which are wanted would be more exposed to the influence of the sun and air, and ripen better. As soon as the leaves begin to drop in the autumn, thin off the ripest of them, by sweeping lightly over the leaves

with a few sprigs of birch tied on a stick : this gives the wood a better opportunity of ripening. When the trees are in an unfavourable soil and situation, and have got too old to be transplantable, and make wood too grassy to be fruitful, lay in the young branches very thin. But, when it is considered that strong branches not bearing fruit so well as weak ones is not so much by reason of their vigour as of their immaturity, the discrepancy will vanish : for, by their being thin, and properly exposed to the action of the weather, they will ripen much better ; and thereby, although strong, a crop of fruit may be obtained by leaving them a good length at the next spring pruning, except where a supply of wood is wanted. By their being thin, a greater quantity of young shoots, for fruit-bearers in the following year, may be left at the disbudding season, which will be pretty moderate. When the tree has carried one or two crops of fruit the point is gained, for we rarely see a fruit-bearing tree too luxuriant. (*Ibid.* vi. 430.)

We have rarely met with more judicious observations than those of Mr. Craig. It is plain to those who know the habits and cultivation of the peach from long experience, that such remarks would only emanate from long and, we will venture to say, successful practice.

Methods of Training.—The French.—No place in the world is more noted for the production of excel-

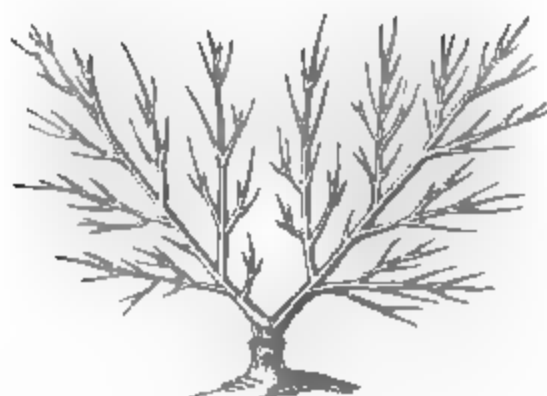
lent peaches than Montreuil, in the vicinity of Paris. Some notice of this has been taken in the first section of this volume; but the success which attends the practice there adopted requires that it should be more particularly noticed. We give such notice more readily because we have it detailed by Mr. J. Smith, gardener at Hopetown House, accompanied by his excellent comments.

The training of fruit-trees on walls, though an artificial operation, is not the work of arbitrary caprice. There are some limits which cannot be passed without nullifying the purpose of all training, viz., the production of fruit. These arise from the peculiar growth of the tree, its duration, the mode in which the fruit is produced, and other circumstances connected with the theory of vegetation. Thus, in the peach, the tendency to fork, and the growth of the fruit, not on spurs, but on the young wood, has introduced the semi-stellular or fan-training; at least in all cases in which its culture has been most skilfully practised. Other limits, such as the equilibrium of the sap, and the greatest possible facility of reproducing fruit-branches, have restricted the French to certain varieties of what has been called the open fan-training. All these modifications proceed upon a principle which is much insisted on, viz., the suppression of the direct channel of the sap. Most fruit-trees, when left to themselves, form an upright stem

or trunk, which conveys the nutritive juices from the roots to the upper extremities. This tendency shews itself even on walls, and hence apple and pear-trees have been generally trained with central trunks. It is also observable in the peach-tree, although in a less degree ; and we consequently find Forsyth, and a few of his followers, training it with the upright stem, from which all the subordinate branches diverge at right angles. This the French condemn, alleging that the sap is wholly carried up to the superior members. They also proscribe the fan-training with a central limb (our common form), on the score of its being destructive of equilibrium. They therefore divide the tree into two equal portions, which they spread out diagonally, leaving the centre completely open. It does not seem very evident that this arrangement is indispensable to maintain the equilibrium ; but it certainly facilitates it greatly ; and, besides, it enables the cultivator to accommodate the tree to low walls, and, by preventing confusion and irregularity, contributes much to ease and freedom in the operations of pruning and training.

1. The form of training which is most generally adopted in France, is that of Montreuil. It appears to have been first invented about the beginning of last century ; but it was scarcely known before 1755, when it was brought into notice by the Abbe Roger Schabol, the most eminent French horticulturist of

his time. According to the principle already mentioned, the tree is divided into two equal parts, in the form of the letter V. In order to effect this, two, and sometimes four, principal branches (mother-branches) are established, which constitute, as it were, the skeleton of the tree. The following sketch from the "Bon Jardinier" of a tree three years trained, will give an idea of the arrangement. In the case of the two mother-branches, they are attached to the wall at an angle of 45 degs.; but when there are four, the centre angle is somewhat less. Although recom-



mended in most French works, it is not advisable to fix the branches at first in so low a position as they are ultimately to occupy, since the branches in the centre will invariably get the start of the others, as has been experienced in certain attempts at imitation in this country. The other branches are all situated on these principal limbs, and diverge from them at angles varying with the age and vigour of the tree.

Great care is taken to preserve them in due subordination to the leaders. The bearing shoots are treated pretty much as they are in this country. In the execution of the training, the operations above described are more or less applied, according to the intelligence of the cultivator.

2. The next form which we shall notice, and which is at least ingenious, is that termed by Count Lelieur the form *a la Dumoutier*, from the name of its inventor. It is stated to be an improvement of the V of Montreuil, and to be distinguished from it and all others, in being less divaricated,—in having its principal members more strongly marked,—and by the entire renovation of the bearing shoots every year, which, being cut down almost to their insertion, give a pinnated appearance to the branches. The following account is gathered from the “*Pomone Francaise*,” a work of considerable merit, although it patronizes one mode of operation exclusively, and passes over all others in silence. As is commonly practised, the stock (of almond, or plum) is planted where the tree is destined to grow, and in the following summer two buds, nearly opposite to each other, are inserted. These produce two shoots, the future mother-branches, which are trained (Fig. 2) nearly in a vertical position, and ought to be as equal in strength as possible. At the first pruning they are cut down to about 15 or 18 inches in length, and the buds, both before and

behind, are rubbed off. The result of the second year's growth is the prolongation of the mother branches (*a*, Fig. 3), and the addition of another



Fig. 2.



Fig. 3.

branch (*b*) on the outside of each. The following summer affords a third pair (*c*); and at the end of that season the tree has the appearance indicated by Fig. 3. During the fourth or fifth year, each of the branches *a*, *b*, *c*, divides into two. Of these three, viz., *a*, *b*, *c*, (Fig. 4) proceed in their original direction, while the others (*d*, *e*, *h*), diverge, and become subordinate members. The next two seasons produce

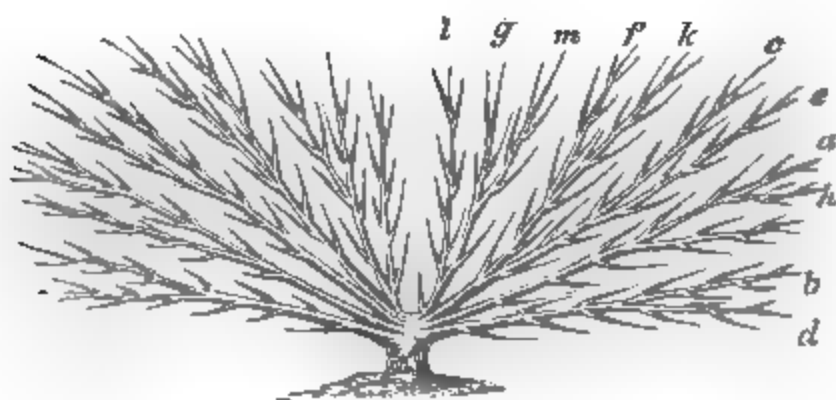


Fig. 4.

the remainder (*f, g, h, l, m*), which complete the development of the tree. Every successive year brings the mother-shoots a little lower, till they are inclined at about an angle of 25 degs. The annexed figure is from a tree which, in nine years, covered a space of wall 42 feet long, and 8 feet high.

The points of the leading shoots are shortened every year to such an extent as circumstances require. So much is symmetry studied, that Count Lelieur instructs us to ensure the equality of both sides by admeasurement; and he assures us that this is always possible, if the tree has been properly managed. In order to produce this, however, the most scrupulous attention is given to regularity; all the means of equalizing the branches are called into exercise, and even the lateral twigs, and those portions of the shoots which are to be cut off in the pruning, are carefully arranged and manipulated.

The pruning for fruit commences in the third year, and is performed with much exactness. As already noticed, the whole of the bearing-wood, with perhaps a few exceptions, is renewed every year. The lateral shoots which appear during summer at the extremity of the leading branches, are cut back to a single eye, together with all other shoots which have no fruit-buds, and at the same time are feeble. When a shoot promises blossom, it is generally at some distance from the point of insertion into the

old wood, and the intermediate space is covered by wood-buds. All the latter, therefore, which are between the old wood, *a*, and the blossom, *c* (Fig. 5), ex-

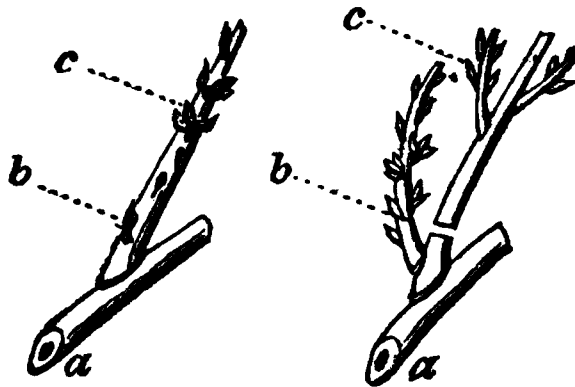


Fig. 5.

cept the lowest, *b*, are carefully removed by disbudding. This never fails to produce a shoot, the growth of which is favoured by destroying the useless spray above the blossoms, and pinching off the points of those which are necessary to perfect the fruit. This is termed the replacing bud. Barren shoots, when too vigorous to be cut down to their lowest eye, are treated exactly in the same manner. At the winter pruning, the branches which have borne fruit are cut down to the insertion of the replacing shoots, which, in their turn, are disbudded, bear fruit, and are cut out like their predecessors. In cases where the blossom has failed in setting, or the fruit in stoning, when the shoot is too weak to ripen the fruit which are upon it, or when the crop is very early, this operation may be performed at any period in the course of the summer. It is then called "return-

ing to the green shoot.” Occasionally, a very promising shoot which has already fruited is allowed to remain. The replacing shoot is cut back to its lowest eye ; or, if it is vigorous, and there is room, it is made in the usual way to produce a substitute. In either case, a new replacing shoot is obtained, to which the whole is invariably shortened at the end of the second year. The branch thus treated is styled the reserve branch.

It is to be remarked, that the replacing shoot, and the branch of reserve, form a part of the Montreuil system of pruning for fruit, but less attention seems to be bestowed upon them, and the rapprochement or cutting back is not so rigorously performed, for we find the fruit-branches passing into subordinate members, while, in the form we have just now described, they remain single and undivided. It is obvious that these operations might be applied to any system of training, even by those who would hesitate to adopt one of the French forms in all its details. It is but justice to observe, that a near approach to these operations has been made by Harrison, in his excellent directions in this department of the culture of peaches.

3. There is yet another variety of the Montreuil form, denominated *a la Sieulle*. The tree is likewise formed upon two mother branches, which, being selected in the first summer, are permanently fixed at the inclination of from 25 to 30 degs., leaving, con-

sequently, a very large angle in the centre. These leading branches are never shortened. Late in the first autumn all the buds are removed except three, one of which is terminal, the other two are at equal distances on opposite sides of the shoot, the one on the outside being nearest the stem. The growth of the second summer lengthens the shoots in their original direction, and produces one from each of the reserved buds. At the beginning of the second winter, the leading shoots are again laid in at full length; the side shoots are shortened about one-third; and, as before, only three buds are allowed to remain. After the lapse of another year, the tree has assumed the following appearance (Fig. 6). Fig. 7 represents a side

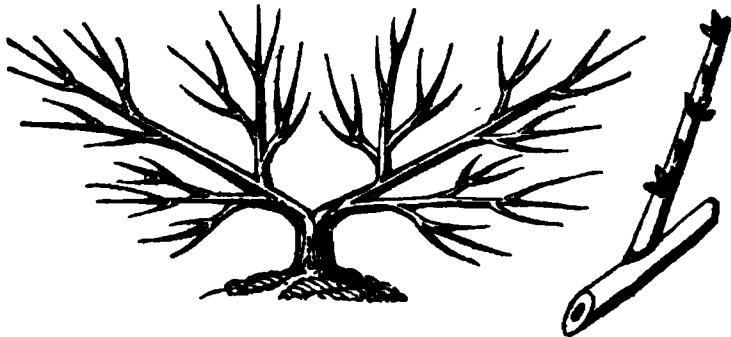


Fig. 6.

Fig. 7.

shoot, after being shortened and disbudded. The same process is continually repeated. The mother-branches grow on in a straight line, and those on the sides pass into subordinate members. This method proceeds upon the position, that fruit-trees are more weakened than strengthened by pruning. Sieulle was led to this conclusion by observing the effects of shears

in topiary work. There is, however, but little analogy between clipping and pruning; and in old trees, where the two leading shoots bear no proportion to the others which are annually shortened, the principle is virtually given up. It must be admitted, however, that the continual disbudding economises the force of the tree, by limiting the number of shoots, and preventing the appearance of those which grow only to be cut off. A considerable diminution of labour is also gained in the busy period of summer.

Under this mode of pruning, the quantity of blossom is necessarily small, since only three double flower-buds at most are ever left on one shoot. This, however, obviates the necessity of thinning the crop, and is said to increase the size, and consequently the flavour of the fruit. In the climate of France, it should seem that the gardener may calculate on the setting of any given flower. (*Caled. Hort. Mem.* iv. 144.)

The eminent success which has been known to accompany the cultivation of peaches in the neighbourhood of Montreuil is a sufficient warrant for paying every attention to the details of their practice. We think that there is little or nothing to be objected to on the score of principle, but many points which the British gardener would do well to imitate. The mode of starting their trees we hold to be of considerable importance: their adopting a pair of shoots

thus **V** as the foundation of the future fabric of the tree is an excellent step, and provides a sort of guarantee that the lower part of the wall shall be furnished. We hold it a principle that the centre of the tree should be composed of wood of a subordinate character. The modification of the strength of the tree may, however, be accomplished in the main by a judicious course of summer stopping, of which we will say more in its proper place.

As for the “form a la Dumoutier,” and termed “a la Siculle,” we can only say that they contain no important principle which is not embodied in the Montreuil mode, but are much more complicated, which, in England, is certainly no recommendation. The demands upon the gardener of these days have increased to such an amount, through the introduction of new plants, as also the carrying out the cultivation of things in general, that those modes must be esteemed preferable which accomplish the end in view in the most simple manner. Much, we opine, of the complication which exists in these matters proceeds from the want of a knowledge of the immense power which lays in the cultivator’s hands to weaken the tree or to equalise its strength by means of judicious disbudding and stopping.

Fan-training.—This is the usual mode of training the peach in England, and the following directions for this mode of training are by an excellent practical

gardener :—The maiden plant is to be headed down to four eyes, placed in such a manner as to throw out two shoots on each side, as shewn in fig. 8. The following season the two uppermost shoots are to be

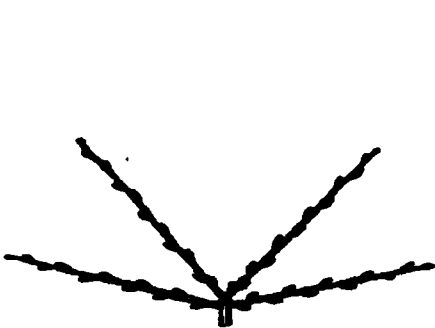


Fig. 8.—Fan-training ; first stage.

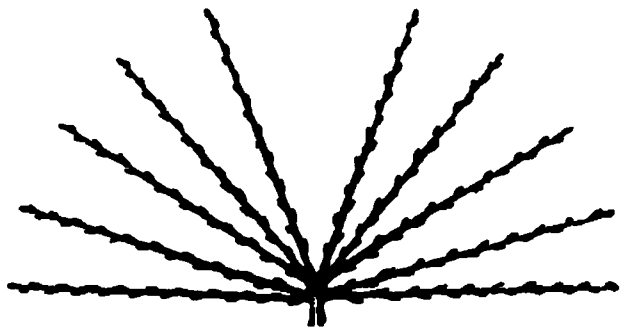


Fig. 9.—Fan-training ; second stage.

headed down to three eyes, placed in such a manner as to throw out one leading shoot, and one shoot on each side ; the two lowermost shoots are to be headed down to two eyes, so as to throw out one leading shoot, and one shoot on the uppermost side, as shown in fig. 9. We have now five leading shoots on each side, well placed, to form our future tree. Each of these shoots must be placed in the exact position in which it is to remain ; and as it is these shoots which are to form the leading character of the future tree, none of them are to be shortened. The tree should by no means be suffered to bear fruit this year. Each shoot must now be suffered to produce, besides the leading shoot at the extremity, two other shoots on the uppermost side, one near to the bottom, and one about midway up the stem ; there must also be

one shoot on the undermost side, placed about midway between the other two. All the other shoots must be pinched off in their infant state. The tree will then assume, at the end of the third year, the appearance shown in fig. 10. From this time it may be allowed to bear what crop of fruit the gardener thinks it able to carry; in determining which he ought never to overrate the vigour of the tree. All of these shoots, except the leading ones, must at the proper season be shortened, but to what length, must be left entirely to the judgment of the gardener; it, of course, depending upon the vigour of the tree. In shortening the shoot, care should be taken to cut back to a bud that will produce a shoot for the following year. Cut close to the bud, so that the wound may heal the following season. The following season, each shoot at the extremities of the leading branches should produce, besides the leading shoot, one on the upper and two on the under part, more or less, according to the vigour of the tree; whilst each

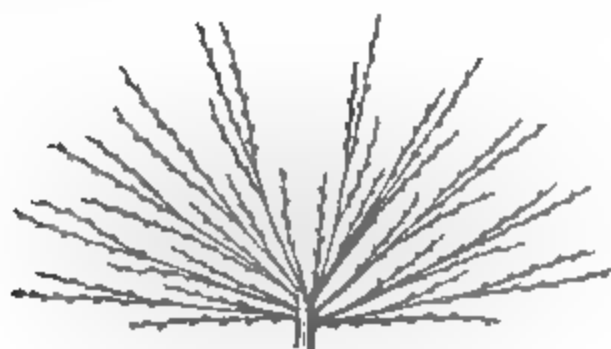


Fig. 10.—Fan-training; third stage

of the secondary branches should produce, besides the leading shoot, one other, placed near to the bottom ; for the grand art of pruning, in all systems to which this class of trees are subjected, consists in preserving a sufficient quantity of young wood at the bottom of the tree ; and on no account must the gardener cut clean away any shoots so placed without well considering if they will be wanted, not only for the present but for the future good appearance of the tree. The quantity of young wood annually laid in must depend upon the vigour of the tree. It would be ridiculous to lay the same quantity of wood into a weakly tree as into a tree full of vigour. The gardener here must use his own judgment. But if any of the leading shoots manifest a disposition to outstrip the others, a larger portion of young wood must be laid in, and a greater quantity of fruit than usual suffered to ripen on the over-vigorous branch ; at the same time, a smaller quantity of fruit than usual must be left to

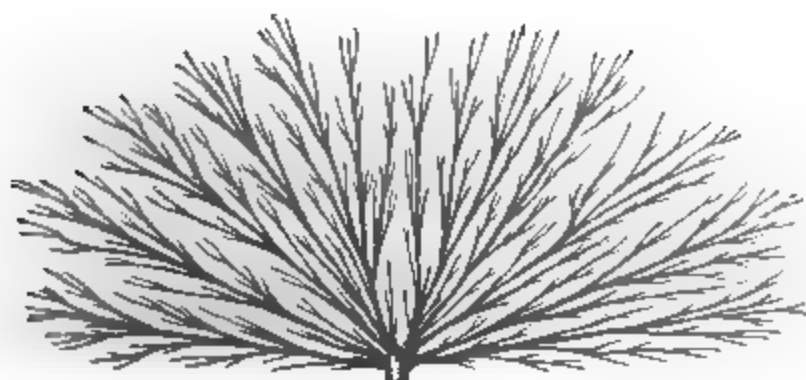


Fig. 11.—Fan-trained peach, in complete form.

ripen on the weaker branch. This will tend to restore the equilibrium better than any other method. Fig. 11 presents us with the figure of the tree in a more advanced state, well balanced, and well calculated for an equal distribution of sap all over its surface. Whenever any of the lower shoots have advanced so far as to incommode the others, they should be cut back to a yearling shoot: this will give them room, and keep the lower part of the tree in order. In nailing, care must be taken not to bruise any part of the shoot; the wounds made by the knife heal quickly, but a bruise often proves incurable. Never let a nail gall any part of the tree: it will endanger the life of the branch. In nailing in the young shoots, to look workmanlike, dispose them as straight and as regularly as possible. Whatever system of training is pursued, the leading branches should be laid in in the exact position they are to remain; for whenever a large branch is brought down to fill the lower part of the wall, the free ascent of the sap is obstructed by the extension of the upper and contraction of the lower parts of the branch. It is thus robbed of part of its former vigour, whilst it seldom fails to throw out immediately behind the part most bent one or more vigorous shoots. To assist the young practitioner in laying in the leading branches of the tree, the following method may perhaps be acceptable. Drive a nail into the wall, exactly where

the centre of the tree is to be ; then, with a string and chalk, describe a semicircle of any diameter, divide the quadrant into 90 degs. ; the lower branch will then take an elevation of about 12, the second of about $27\frac{1}{2}$, the third about 43, the fourth $58\frac{1}{2}$, and the fifth about $74\frac{1}{2}$ degs. A nail should then be driven into each of these points, and the chalk rubbed off. (*Gard. Mag.* ii. 144.)

One chief objection to fan-training, though not the only one, is that even with the most successfully applied skill, the centre of the tree is almost always too bare of young and fruitful shoots. To obviate this, several modes of training have been adopted, the best of which are the following :—

Mr. J. Seymour's Plan.—Mr. J. Seymour carried his system very successfully into practice at Carlton, near Snaith, in Yorkshire, and is thus detailed by him :—

A maiden plant must be cut down to three eyes ; and three shoots being produced, the two lower ones are left at full length, and the succeeding spring the centre shoot is again cut down to three eyes. At the time of disbudding the trees, all the buds on the lower side of the two horizontal branches are rubbed off, and buds are left on the upper side of the branches at a distance of from nine to twelve inches from each other. These are suffered to grow five or six inches, and are then stopped, but still suffering

the leading shoot to extend itself. At the second spring-pruning, the centre shoot is again cut to three eyes ; or, if the tree be very vigorous, five eyes may be left ; two for each side, and a centre one for again furnishing the leading shoots. The leading shoots are laid in in the fan form, nine or ten inches from each other ; the shoots on the leading branch are nailed to the wall in summer, but after the winter's pruning they are tied to the leading shoots with strands of matting ; thus keeping the space between the leading shoots clear, for the succeeding summer's shoots to be nailed in, where they get well ripened, and mature their buds for another crop. At the winter's pruning they are cut to three or four inches, according to their strength, as in fig. 12, *a*. The



Fig. 12.

maiden plant being headed down, the first winter will present two side shoots, and the upright shoot shortened to three buds (*b*) ; the second year, at the end of summer, there will be four side shoots, and six or more laterals (*c*) ; in the following spring-pruning, the laterals (*d*), which had been nailed to the wall, are loosened and tied to their main shoot (*e*), and the

upright shoot shortened to three buds (*f*), as before. At the end of the third summer the laterals will be doubled on the old wood, by one having sprung from the base of the shoot tied in fig. 13 (*g*), and another from its extremity (*h*). In the pruning of the follow-



Fig. 13.

ing spring, the laterals of two years' growth, which had borne fruit, are cut off close, and the young late-

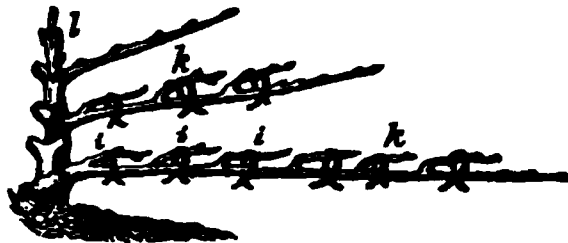


Fig. 14.

als which had sprung from their base (*i*), fig. 14, are loosened from the wall, and tied down to succeed them; the other laterals (*k*) are tied in, and the upright shoots shortened (*l*) as before.

Now, or before, the side shoots will have to be headed down once, or even twice, so as to increase their number, and regularly cover the wall. The extent to which this practice is carried, will depend on

the height of the wall, and the distance of the trees from each other; the ultimate object being to produce a fan-form, as regular as possible, of permanent wood, with no young wood thereon besides what is produced along the spokes of the fan on the upper side, at about 12 inches apart, and the prolongation of the shoots.

In the course of the winter or spring of the third year shorten the side shoots to about 10 or 12 inches, as may be most convenient for wood buds, to get two principal leading shoots from each side shoot; the first about three inches from the stem, as the bud may suit, and the other at the end of the shortened shoots, so as to double the leading shoots. The upright shoot is always cut at three of the lowest and most suitable buds, so as the stem may be kept as short as possible; for, unless the side shoots are multiplied, the stem gets too high. If the sides shoots are strong the year after cutting down, they may be laid in their whole length; but if weak, they must be cut short to give them strength. Continue in this way to double the side shoots for two or three years, by which the tree will get strength, and then it will admit of the side shoots being shortened to about 14 inches. Cut for two or three years, so as to produce three shoots upon each side shoot, and so continue until there is a sufficient number of leading shoots to furnish the wall.

After the tree has got into a bearing state, cut the lateral shoots to about eight or nine inches, taking

care to cut at a wood bud; and at the time of disbud-
ding, leave the best situated buds, and those nearest
the base, for the future year's bearing. (*Ibid.* i. 129,
and ii. 296.)

Mr. Seymour's plan is a good one, and is very sys-
tematic. We have seen it in practice, and can vouch
for its being successful, but we much fear that few could
bestow the attention necessary at the respective periods;
and if once neglected through pressure of business,
the whole falls into confusion. Otherwise it is a most
ingenious mode, and becomes an ornament to a garden.

Mr. W. Seymour's Plan.—This Mr. Seymour is
gardener to H. Preston, Esq., of Morely, near York,
and his system differs chiefly from that of his name-
sake in not removing the summer laterals, but train-
ing them in to be bearers, if not the next, the second
year. His directions are as follow:—

In the spring, as soon as the young shoots have
grown to about an inch long, begin to disbud or
thumb-prune them, by taking off all the young shoots
where there is no blossom or fruit, except the lowest
one upon the bearing branch, and that at the extreme
point of it: this end shoot allow to grow about three
inches, and then stop; and break off all the buds by
the fruit except four of their bottom leaves, so as to
make a cover for the young fruit until the time of
thinning, when those little spurs are to be taken away
with the fruit that is not wanted, and the others re-

tained along with the fruit that is left. By so doing, we are only growing the shoot that we shall want next year for bearing fruit, which gives the trees an opportunity of extending themselves, and making good wood. Instead of taking off the summer laterals or water-shoots (as they are sometimes called), as is generally done, lay them in at regular distances, the same as a natural spring shoot; and, if they do not bear fruit the next summer, they will produce fine bearing-wood for a future year; so that you have not to shorten those strong shoots, but lay them in their whole length for main or secondary leading branches. When the young shoots at the base of the fruit-bearing ones, or the extending part of the leading branches, have grown 4 or 5 inches, tie them down to the other branches as close as they will admit without breaking or pinching them, and keep them close to the wall through the summer. By this means they will get perfectly ripe and firm, and not be so luxuriant as when permitted to grow from the wall almost wild; and the fruit must, of course, be larger when the wood is thin, than when it is permitted to grow twice as large as is necessary. There will be found, when disbudding, at the base of the shoots small buds that are not likely to make a shoot that season, but they must be retained, as they will produce a shoot in a future year, and then bring your young wood nearer home. (*Ibid.* vi. 435.)

We have some doubts of so extensive a use of summer laterals; we use them occasionally, but we take care to stop them when a few eyes long, for their tendency, if suffered to proceed unrestrained, is to augment the strength of the superior parts of the tree at the expense of the inferior.

Mr. Mitchell's Plan.—Mr. Mitchell, of Sudbury Garden, aims at having fewer leading branches than are usually worked in by other gardeners, whereby, he considers, more organizable matter is devoted to the production of bearing-wood. The following directions are from his own pen:—Below is a sketch of a Royal George peach tree planted on the back wall of a peach-house seven years ago. The figure in question was taken after the operation of pruning in the seventh year was completed, at which time it extended thirty-two feet in length. A correct idea will be obtained by referring to the woodcut, fig. 15 (a),

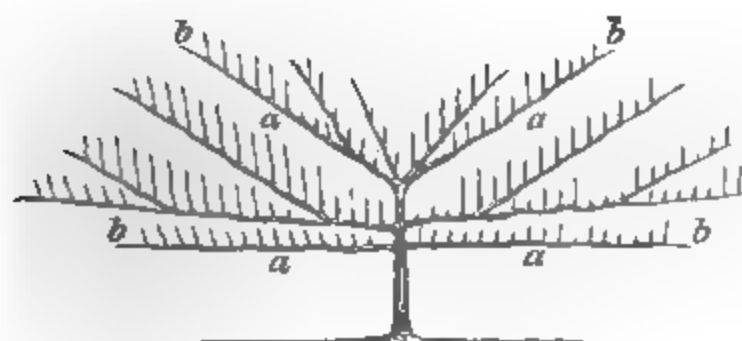


Fig. 16.

representing the leading branches, and (b) the fruit-bearing wood, which is regular and uniform in size

from the centre to the extremity of the tree. Nothing can be less difficult to manage, disbudding being attended to, and leaving the lowest bud on the wood (*b*), to produce a shoot for the following season; also the terminal bud on the wood (*b*) is allowed to grow a few inches before stopping it. With a little attention to tying, the work is finished till the winter pruning, which is done by cutting out the wood which produced the last crop, and tying in the young wood for the future crop. The merits of this system are the economising of organic matter in producing few leading branches, and an additional amount of fruit-bearing wood, with the leaves in a position fitted to take the greatest amount of advantage from the atmosphere and light. In proof of a vigorous constitution, the Horticultural Society of London awarded a medal to fruit gathered from this tree in 1842 and 1843. (*Gard. Journ.* 1845, 217.)

Training on Low Walls.—Mr. W. Seymour says,



Fig. 16.

for training on low walls, take a maiden plant, and treat it as described in fig. 12, p. 100, so as to produce a tree in this form, fig. 16, and when it has grown too large for the wall, it may very easily be changed in figure, in the manner of fig. 17. By these means the fan, curvilinear, and horizontal style will be combined; and the gardener will be prepared, in case of an accident, because any of the branches produced from *a a* may be made leading ones. (*Gard. Mag.* vi. 436.)

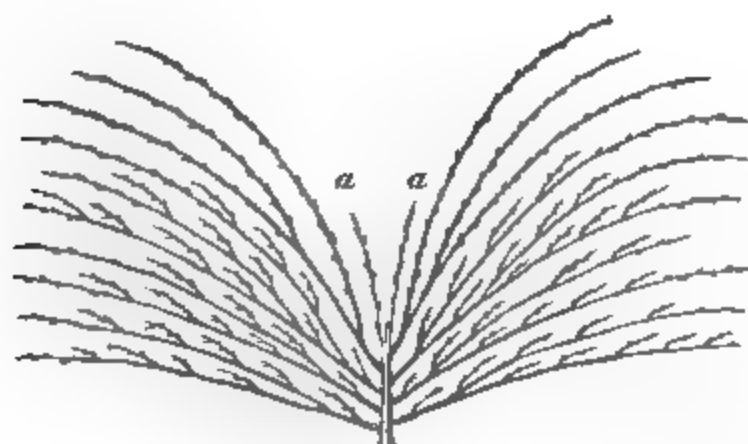


Fig. 17.

Summer Pruning is of far more importance than that of the winter.

In May and June, and occasionally in the succeeding months, it is necessary to regulate the shoots of the same year, and to prevent improper growths by disbudding. Pinch off fore-right buds or shoots; and pinch off or cut out ill-placed, very weakly, spongy, and deformed shoots, retaining a plentiful supply of

good lateral shoots in all parts of the tree, and leaving a leader to each branch.

Let them mostly be trained in at full length, all summer, about three inches asunder, for next year's bearers ; and divest them of any lateral twigs to prevent a thicket-like intricacy, and to promote a healthy fruitful growth in the shoots themselves. In the course of the summer regulation, if any partial vacancy occurs, or should a young tree under training want an additional supply of wood, shorten some conveniently placed strong shoot, in June, to a few eyes, to furnish a supply of laterals the same season.

This disbudding and regulation should be done by degrees. If many shoots and leaves are removed suddenly, it occasions gumming, and over-luxuriance in the shoots that remain. If shoots are very strong, train them as nearly perpendicular as is admissable, that there may be no check to the sap's return. Shoots less robust train horizontally. (*Johnson's Dict. of Mod. Gardening.*)

Disbudding being one of the most important summer operations, some explanation of its principles and the mode of operation may prove useful. It is necessary to bear in mind that on the quality of foliage with which a tree is furnished depends the increase in diameter of the stem and branches, the extension and increase of roots, and the production of fruit ; and yet, that no more leaves should be retained than

can be freely exposed to light. In the case of a healthy tree, one-half of the shoots and foliage it naturally produces could not be thus exposed when trained against a wall. If all the branches of a round-headed standard tree were disposed in a flattened or fan-like manner against a wall, they would be greatly overcrowded; for instead of a surface equal to that of a sphere, the foliage would be reduced within a diametrical section of the same, affording a surface of only one quarter of that which they formerly had. Hence it is evident that a considerable reduction of shoots produced by wall-trees must be effected in some way or other. This is partly done by shortening and



Fig. 10.

thinning at the winter pruning, and partly by the process of disbudding in summer. Let the accompanying wood-cut represent part of a bearing-shoot ; the lowest bud is left because it is the lowest, and is, therefore, most eligible for "training in" during the season, in order to furnish, next spring, a similar bearing-shoot to that now represented, which will be cut back to the said lowest shoot. The second bud from the base is also left, for the sake of a fruit-blossom which is connected with it. The shoots which were pushing at *a*, *b*, and *c*, fig. 18, are removed, or disbudded. In removing the buds, care should be taken not to injure the bark of the shoot. The buds, *a*, *b*, *c*, ought not to be all disbudded at the same time ; *b*, the fore-right one, should be first removed, and the others successively, at intervals of several days, in order not to check the circulation of sap by a too great privation of foliage at once. The terminal shoot is left because there is a blossom at its base. As was above observed, the lowest shoots must be preserved throughout the summer ; the other two having fruit at their base may be shortened back to about three inches after their leaves have attained the full size, and the base of the shoots has acquired some degree of firmness. The shoots of peach trees that have been neglected may be reduced to order without any material injury, if the removal of superfluous shoots is thus made by little at a time. (*Gard. Chron.* 1841, 380.)

Stepping the shoots in August, about the last week, is a very important operation. It is done by pinching off the leading bud of each, and thus preventing their increase of length concentrates the sap upon the wood, buds, &c. already formed, enables them to be more perfectly developed, and, being done late in the season, there is no danger of more laterals being induced. If the stopping is done too early, or if all the shoots are stopped at one time, laterals will be produced and the organizable matter be diminished from, instead of concentrated on, the bearing-wood of next year.

Autumn Pruning may be performed at the fall of the leaf, and thence, according to some professional writers, at any time in mild weather until spring. Let it be remembered that the earlier it is done in the autumn, the greater strength is given to the remaining shoots. It should be completed in February or early in March, before the blossom-buds are considerably advanced, which are distinguishable by being round, plump, and prominent, while the leaf and shoot-buds are oblong and narrow. Retain, in all parts of the tree, a competent supply of such regular grown shoots of last year as are apparently fruitful in blossom-buds. Most part of these should be shortened, not indiscriminately, but according to their strength and situation; the very strong shoots should be left longer, being topped about one-fourth or one-

third. Shoots of middling vigour reduce one-third or one-half; and prune the very weak to two or three buds. Always cut at a shoot-bud to advance for a leader. Sometimes a shoot-bud lies between a twin blossom-bud; cut half an inch above the bud. As many new shoots as will lie from three to six inches asunder may be deemed a competent supply: remove or reduce some part of the former bearers. Cut out quite close the redundant, irregular, and other improper shoots: remove or reduce some parts of the former bearers of the two preceding years, cutting the most naked quite away, and others down to the most eligible young branch or well-placed shoot. Also take out all diseased and dead wood, retaining young where necessary to fill a vacuity. (*Johnson's Dict. Mod. Gardening.*)

Sheltering the blossom is an essential practice to secure a crop of peaches; for, at the time the blossom is opening in April and May, there invariably occur easterly winds and night frosts, which always prove fatal if the blossoms are exposed to them without shelter.

All cooling is occasioned either by the heat being conducted from a body by a colder, which is in contact with it, or by radiating from the body cooled, though circumstances accelerate or retard the radiation; and whatever checks the radiation of heat from a body is a screen, and keeps it warmer. For exam-

ple, a thermometer placed upon a grass-plot, exposed to a clear sky, fell to 35 degs. ; but another thermometer, within a few yards of the preceding, but with the radiation of the rays of heat from the grass checked by no other covering than a cambric pocket-handkerchief, declined no lower than 42 degs. No difference of result occurs whether the radiating surface be parallel or perpendicular to the horizon ; for when the mercury in a thermometer, hung against an openly-exposed wall, fell to 38 degs., another thermometer, against the same wall, but beneath a web of gauze stretched tightly, at a few inches distance, indicated a temperature of 43 degs.

These results explain the beneficial operation of apparently such slight screens to our wall-fruit when in blossom. A sheet of canvass or of netting prevents the direct radiation of heat from the wall ; the cooling goes on more slowly, and is not reduced to that of the exterior air at night before the return of day begins to re-elevate the external temperature.

The colder the body surrounding another body, the more rapid the radiation from the latter ; for it is a law of heat that it has a constant tendency to be diffused equally ; and the greater the diversity of temperature between two bodies in contact with each other, the greater is the rapidity with which the progress towards equilibrium goes on. This is one reason why a temperature of 32 degs., with a brisk wind

attending it, will injure plants to a far greater extent than a temperature many degrees lower, with a still atmosphere ; but it is aided by the operation of another law of heat, viz., that aeriform bodies convey it from a cooling body, as a wall or a tree, by an actual change in the situation of their own particles. That portion of the air which is nearest to the cooling body is expanded, and becoming specifically lighter, ascends, and is replaced by a colder portion. This, in its turn, becomes heated and dilated, and gives place to another colder portion. And thus the process goes on, until the cooling body is reduced to the same temperature as the air.

In a still atmosphere, this goes on slowly ; the air in contact with the wall and tree rises very gradually as it imbibes warmth from them ; but if there be a brisk wind, a constant current of air at the lowest temperature then occurring, is brought in constant contact with them, and the cooling is rapid, in accordance with the law of equilibrium just noticed. A shelter of netting, or even the sprays of evergreens, are of the greatest service in preventing the sweeping contact of cold air at such times. Snow is good shelter ; it prevents heat radiating from plants ; protects them from the chilling blasts ; and is one of the worst conductors of heat. We have never known the surface of the earth, below a covering of snow, colder than 32 degs., even when the temperature of the air above has been 28 degs.

Strange as it may appear, yet it is nevertheless true, that a screen is more beneficial in preserving the temperature of trees, when from three to six inches from them, than when in immediate contact with their surfaces. When a woollen net was suspended four inches from the wall on which a peach tree was trained, the thermometer fell very slowly, and the lowest degree it reached was 38 degs. ; when the same screen was twelve inches off, it fell to 34 degs. ; and when drawn tightly over the tree, it barely kept above 32 degs., the temperature of the exterior air. When at twelve inches from the wall, it permitted the too free circulation of the air ; and when in immediate contact with the polished bark of the peach, perhaps another law of cooling came into operation. The law is, that polished surfaces radiate heat slowest. Thus, if two glass bottles, equal in size and thickness of glass, and of the same shape, be filled with warm water, and one of the bottles be covered with an envelope of fine muslin, this bottle will give out heat to the surrounding air with much greater rapidity than the other bottle ; so that, in a given time, the bottle with the envelop will be found colder than the one which has no covering.

Screens, such as the preceding, or the slightest agents, sprays of evergreens, placed before the branches of wall-trees or other plants, as already noticed, operate beneficially in another way, checking

the rapid passage of the air over them : such passage is detrimental in proportion to its rapidity, for the more rapid it is, the greater is the amount of evaporation, and, consequently, of cold produced. Mr. Daniell says, that “ a surface which exhales one hundred parts of moisture when the air is calm, exhales one hundred and twenty-five parts when exposed to a moderate breeze, and one hundred and fifty parts when the wind is high.”

During all high winds, but especially when blowing from points varying between the east and the south, for they are the driest in this country, the gardener will always find shelter is beneficial to his plants, whether in blossom or with fruit in its first stages of growth, for these winds cause an evaporation much exceeding in amount the supply of moisture afforded by the roots.

In March, such shelters are much required, for the winds are then violent and dry even to a proverb ; but it is during the days of its successor, April, that sets in the only periodical wind known in this island. It comes intermittingly, and with a variable force from points ranging from east to north-east, and is one of the most blighting winds we have. It continues until about the end of the second week in May, though often until its close ; and it is a good plan to have the tree, during the whole period, by day as well as by night, protected. This periodical wind is

occasioned, probably, by Sweden and Norway remaining covered with snow, whilst England is some 20 degrees or more warmer; and an upper current of warm air is consequently flowing hence to those countries, whilst a cold under current is rushing hither to supply its place. This wind, and its consequent cold weather, is so regular in its appearance, that in Hampshire, and some other parts of England, the peasantry speak of it as "the black-thorn winter," that bush being in blossom during a part of its continuance. (*Johnson's Principles of Gardening.*)

We have already noticed that very slight protection is sufficient to keep the blossoms in safety. One simple mode is to strain lines from the top of your wall to the ground, at an angle of 20 degs., and then to run haybands across from line to line at 18 inches distance. There is no better protection for peaches in spring. But there are many others; spruce-fir-branches, for instance. (*Gard. Chron.* 1846, 650.)

Mr. Lee, of Ottery, St. Mary, Devonshire, has been in the habit of protecting his wall-fruit trees, during the period of flowering and setting of the fruit, with *common fern*. He merely inserts the fronds of the fern behind the branches, arranging them in front of, and in proportion to, the length of the shoots. (*Gard. Mag.* iv. 279.)

Netting is used in a very efficient manner in the garden of the Horticultural Society of London, to

protect a peach-wall. The stone coping of this wall projects over it about an inch and a half, with a groove or throating underneath. Coping-boards nine inches broad, fitted to join at their ends by means of plates of iron, are supported on iron brackets built into the wall. The annexed figure, 18, shews one of these brackets, in which *a* is an iron which is built into the wall, the thickness of a board below the stone coping; and *b*, the hole for the iron pin which secures the wooden coping. To these brackets the coping-boards are secured by broad-headed iron pins, passing through corresponding holes (*b*) in the board and

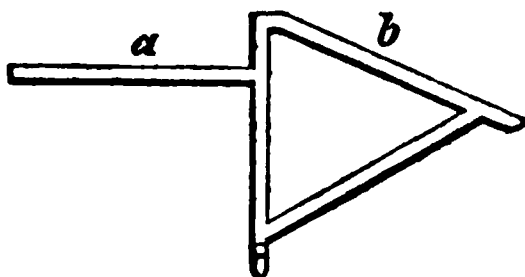


Fig. 18.

bracket, a slip of iron, or "spare-nail," being then introduced through an eye in the lower end of the pin. The upper edge of the board is slightly levelled, so as to fit as closely as possible to the under side of the coping of the wall, in order effectually to obstruct the radiation of heat, and the ascent of warm air. From this coping, woollen netting of various kinds, common netting such as fishermen use, bunting, and thin canvass, have been let down, and tried experimentally, in the course of the last fifteen years; and we are in-

formed by Mr. Thomson, that after repeated trials, the thin canvass was found the preferable article for utility, appearance, and duration. This description of fabric costs about 4d. per yard, procured from Dundee. It requires to be joined into convenient lengths, or into the whole length of the wall to be covered, and bound with tape at top and bottom, and to have loops or rings sewed to it at top, by which it is secured to small hooks screwed to the upper side of the coping-boards. These hooks serve also for attaching the ends of pieces of twine, which are stretched down to pegs driven in a line four feet from the bottom of the wall. These twine-rafters are stretched at intervals of twelve feet, and support the canvass at a uniform slope, the appearance being that of an elegant light roof, reaching to within three feet of the ground. The coping-boards are put up before the blossom-buds of the peach-trees are swelled so much as to exhibit the tips of the petals; and before the most forward buds open, the thin canvass (or netting, if that should be preferred,) should be attached to the hooks. The covering is generally put up about the beginning of March, and it remains on without being opened or altered, till all danger from frost is over, which is generally, in the climate of London, about the middle of May. The coping is entirely removed at the same time as the canvass, because the trees are found to thrive much better when exposed to perpendicular

rains and dews. The canvass is found to be of great utility in bright sunny weather, when the trees are in full blossom; for the peach and other stone-fruit, which in their native country blossom at an early period of the season, whilst the air is yet cool, do not succeed so well in setting when the blossoms are exposed to as much as 100 deg., which they frequently are, against a south wall. The thin canvass admits also plenty of air; while woollen netting, which it might be thought would admit still more air, was found to render the leaves too tender, in which case they suffer from the intensity of the light when the netting is removed. Common thread netting is not liable to produce this effect, being much more airy; and this netting has the advantage, when not placed farther than a foot from the wall, of admitting of the trees being syringed through it. Very little syringing, however, is required till the trees are out of blossom, and none while they are in blossom; and when the space between the canvass and the wall is nine inches wide at top, and four feet wide at the bottom, as in the Horticultural Society's garden, the syringing can be very well performed in the space within. Perhaps it would be an improvement in the case of the Horticultural Society's wall, to have the coping as much as eighteen inches wide, as no frost, unless very severe indeed, would injure the blossoms of fruit trees trained against a wall with such a projection; but the

iron fastenings for such a coping would require to be much stronger than for nine-inch copings, on account of the greater power which the wind would have over them. (*Loudon's Suburban Gard.* 175.)

For wall-trees, now that glass is become so much cheaper, the best of all screens may be employed, viz., glazed frames, of a length extending from the coping of the wall to the surface of the soil, about two feet from the stems of the trees.

There is some difference of opinion, we confess, even amongst practical men, as to the propriety of protection, but we can state that, after a trial of many years, we see no reason to doubt its efficacy, and could wish to see it both more generally adopted and rendered more complete than we usually find it. If the copings are temporary we would have them as wide as we could get them, providing they could be made safe. The arguments about excluding the dews we regard as nothing in this case; indeed, such are as well dispensed with during the blossoming period. The protection we use is a coarse canvass of an open texture; the meshes about the eighth of an inch in diameter. We generally put ours up a week or two before the blossoms open, in order to retard, or at least prevent, the too hurried opening of the blossoms, which may occur somewhat prematurely through intense sunshine. Great attention should be given as to the daily removal of it when the trees are in blos-

som, and, indeed, as long as it remains on the trees, for the blossom will soon become weak and the leaves etiolated if this point be neglected. When, however, a cutting east wind prevails, we make a point of leaving the canvass on: such winds do much damage in robbing both wall and tree of their heat.

Thinning.—The first thinning should take place when the fruit is about the size of peas, and should be performed with care; a small but blunt pointed pair of scissors is often used with advantage, or the finger and thumb, with a small pointed stick, is very well adapted for removing them. At this thinning a few only should be taken. The second thinning should be performed when the fruit is about the size of small gooseberries. If this second thinning could be dispensed with, it would be of great advantage to the trees; but from such causes as overcropping the preceding year, and the multiplied causes which affect the health of the trees, many of the fruit fall off during the season of stoning, so that experience has proved the necessity of leaving a few to be removed at this season. The quantity of fruit each tree should bear ought to be determined by the state of the tree itself. Sickly and young trees should be allowed to bear fewer fruit than the healthy and well-established plants; and in either case those varieties which produce large fruit should not be allowed to mature so great a number as those which bear small fruit. Over-

luxuriant trees should be allowed to bear what is termed a heavy crop ; this will moderate their luxuriance, and prove beneficial to the tree itself. (*Gard. and Flor.* iii. 333.)

Thinning, like disbudding, is best done in a progressive way. Our practice is to go over in the first case and remove those which are in contact with each other, or at least one where two fruits touch. Where a good "set" occurs, they will soon require another thinning, and by this time those which are of superior character and size may be readily distinguished. Inferior fruit and cripples may now be removed, at least where too thick. By the time that the young shoots require tacking to the wall, a few more may require to be removed, and, by this time, some will be distorted by being squeezed between the shoots and the wall. These, if the crop be abundant, may at once be removed.

Perhaps the rule nearest to general applicability, is to have a space of nine inches between every brace of fruit upon the weaker shoots, and a six-inch space between those on the stronger ; but first-rate fruit of the large varieties should never be nearer than 12 inches to each other.

Gathering should take place a day or two before the fruit is to be used, and before it is dead ripe, and it should be laid on clean paper in the summer-fruit-room. Peaches may be gathered in the heat of the

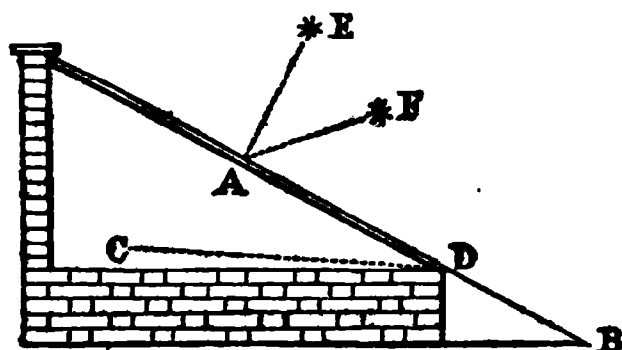
day without any deterioration of flavour ; in this respect they are very different from such northern fruits as the gooseberry, currant, and strawberry, which should be gathered in the morning. (*Suburban Gard.* 594.)

It is a common practice to lay littery material beneath the trees to save from bruising the fruit which falls, and sometimes those which fall are extremely luscious. We would, however, rather remove them from the tree by hand, but this is a practice which requires experience. In very hot weather some kinds of peaches will be ripe and soft on the high-coloured side, and quite hard on the other ; this seems to show that the ripening has been too hurried. Indeed, in hot summers, or periods of continued sunshine, we are persuaded that this is frequently the case, and that over quick ripening is antagonistic to high flavour. This principle is well known in the case of strawberries, melons, &c., and will be found to hold good with regard to the peach. Since it is impossible to tell when all kinds are ripe by mere appearance, a little thumbing becomes necessary, and a gentle squeeze at the point where the stalk joins the fruit will soon determine whether it be ripe enough. This mode, we confess, will produce a very trifling amount of discolouration, but if nicely managed such will hardly be seen ; and fruit which are somewhat soft at this point will generally be in prime order.

When peaches hang long on the tree after their usual period of maturity, their flavour invariably becomes deteriorated. Melting peaches, like the Late Admirable, become mealy, while the sugary nature of the juice is changed. Clingstone varieties, such as the Catherine, retain their qualities longer. (*Gard. Chron.* 1845, 820.)

PEACH-HOUSE.

Its construction.—The best form for a peach-house is thus described by the late T. A. Knight, Esq.



As the lights to be moved to the required extent with facility must necessarily be short, the back wall of the house must scarcely extend nine feet in height, and this height raises the rafters sufficiently high to permit the tallest person to walk with perfect convenience under them. The lights are divided in the middle at the point A, and the lower are made to slide down to the D, and the upper to the point A. The flue or hot water pipe enters on the east or west end, as most convenient, and passes within six inches of

the east and west wall, but not within less than two feet of the low front wall, and it returns in a parallel line through the middle of the house, in the direction either east or west, and goes out at the point at which it entered. The house takes two rows of peach or nectarine trees, one of which is trained on trellises, with intervals between for the gardener to pass, paralleled with the dotted line c. These trees must be planted between the flue and the front wall, and the other row near the back wall, against which they are to be trained.

If early varieties be planted in the front, and the earliest where the flue first enters, these being trained immediately over the flue, and at a small distance above it, will ripen first; and if the lower lights be drawn down in fine weather to the point B, every part of the fruit on the trees which are trained nearly horizontally along the dotted line c, will receive the full influence of the sun. The upper lights must be moved as usual by cords and pulleys, and if these be let down to the point A, after the fruit in the front tree is gathered, every part of the trees on the back wall will be fully exposed to the sun, at any period of the spring and summer after the middle of April, without the intervention of the glass. A single fireplace will be sufficient for a house fifty feet long, and the foregoing plan and dimensions will be found to combine more advantage than can ever be

obtained in a higher or wider house. Both the walls and flue must stand on arches, to permit the roots of the trees to extend themselves in every direction beyond the limits of the walls, for whatever be the more remote causes of mildew, the immediate cause generally appears to be want of moisture beneath the soil, with much dampness above it. A bar of wood must extend from D to B, opposite the middle of each lower light, to support it when drawn down. (*Knight's Papers*, 186.)

The angle recommended by Mr. Knight as being best for the peach-house is 34 degs. 55 min., supposing that the greatest attainable amount of light is required in May. This, however, was calculated for the latitude of his own residence, Downton, in Herefordshire; but as the latitude and the time when most light is required vary, we give the following rules as detailed by Mr. Caie, whereby any one may ascertain the most desirable angle for the roof of his peach-house, accordingly as circumstances vary.

In the construction of forcing-houses, the proper angles should be selected to suit the period intended for producing each particular crop, and to be adapted for different latitudes, to receive the most vertical rays of the sun for ripening the fruit. The sun's declination in each month :—

		DEG.	MIN.
Jan. 21,	the declination is, south . .	19	52
Feb. 21	„ „	10	29

Mar. 21, the declination is, north ..	0	19
Apr. 21	„	11 55
May 21	„	20 13
June 21	„	23 28
July 21	„	20 13
Aug. 21	„	12 27
Sept. 21	„	0 40
Oct. 21	„ south ..	10 46
Nov. 21	„	19 59
Dec. 21	„	23 28

When the sun has a north declination, or is north of the equator :—

	DEG.	MIN.
From the degree of latitude, say ..	52	0
Subtract the sun's declination, suppose about the 22nd June, when it is highest	23	30

The remainder gives the angle required **28 30**

When the sun has a south declination, or is south of the equator :—

	DEG.	MIN.
To the degree of latitude	52	0
Add the sun's declination, suppose about the 22nd Dec., when it is least	23	30

The remainder gives the angle required **75 30**

The degree of latitude must be that of the place where it is intended to erect the houses. (*Gard. Chron.* 1841, 198.)

The peach-house recommended by Mr. Knight is heated either by flues or hot water in pipes, but Mr. W. Henderson, gardener to W. F. Campbell, Esq.,

of Lanark, has furnished the following description of a peachery, very successfully heated, in part, by fermenting materials :—

The peach-house is 45 feet long, and 13 feet six inches wide ; the front of the house stands on pillars ; the trees are planted inside of the house, 14 inches from the front wall. There are two nine-inch courses of freestone above the border, and a sash ; which, including the top and bottom wall-plates of wood, makes the whole height of the front four feet six inches. A man can pass along the front, betwixt the trees and the upright sash, to prune and dress them as far as he can reach up. The trees are trained on a trellis of wood ; this, at first, is three and a half feet distant from the front sash ; after it passes the front sash, the trellis is parallel to the sloping glass, two feet three inches from the glass, and is continued thus to the top of the house. There is only one flue, which, coming from the back, at the east end of the house, runs along the middle of the border to the opposite end, and returns, entering into a chimney over the fire. Between the flue and the back wall, is a pit three feet deep, and four feet eight inches wide, which is kept filled with dead leaves of trees, the steam of which contributes much to the healthiness of the trees within the house. The flue is raised 19 inches above the border ; the return flue is contiguous to the pit, being separated only by a partition of bricks on edge.

The top of the flue thus doubled, being three feet wide, is covered with stone three inches thick, which forms a walk along the middle of the house. (*Hort. Soc. Trans.* vii. 209.)

The combination of a fermenting body with fire-heat is of course judicious, especially where a flue is employed, which is now generally considered a nuisance. We regret that Mr. Henderson did not state the precise position of the flue, which, we confess, we cannot infer from his paper. We have grown peaches by a similar plan, and have obtained several medals for them: our heating was, however, pipes in combination with the steam from leaves. Two feet three inches is rather too far from the roof. Ours is about eighteen inches, which distance we find amply sufficient.

Our own experience is decidedly in favour of hot water in tanks as a source of heat for the peach house; not only because it is the most regular and most manageable, but because, as observed by Mr. Liddiard, it is free from the noxious gases that escape through the joints of brick flues. Although good crops are produced from houses heated by flues, nevertheless, as they were generally heated by one flue, that part near the fire is always many degrees hotter than the opposite end, and this is unfavourable for the production of good fruit at an early season. Such an irregularity is obviated by the use of hot water, an equal degree of

temperature being secured in all parts of the house. (*Gard. Chron.* 1841, 198.)

Temperature.—As might be expected from the native country of the peach, it is very impatient of a high temperature in the early period of its vegetation. We have observed upon this, however, in a previous page. If the mean temperature of February amounts to 40 degs., and that of March to 44 or 45 degs., the peach tree will be in full flower against a wall with a south aspect about the last week in March; and the general crop will be ripe in the last week of August, or first week of September, provided the mean temperature of April be 49 degs., May 55 degs., June 61 degs., July 64 degs., and that of August 63 degs. The period required for the maturation of the fruit from the time of flowering is, on the open wall, five months; but it may be reduced to four by means of fire-heat and the protection of glass. It cannot, however, be advantageously diminished any further. This fact being borne in mind, it is easy for the gardener to know at what time to commence forcing his peaches in order to obtain a crop in a given month. As it must be flowered under a comparatively low degree of temperature, it cannot, therefore, be well forced simultaneously with the vine; for the temperature of March, which in this climate seems to bring the peach into flower, does not unfold the buds of the vine, this being only effected a month

or six weeks farther in the season by a mean temperature of 55 degs. The peach may be subjected at first to a temperature of 45 degs., but not exceeding 55 degs. till the flowering is over, after which it may be gradually raised to 60 degs., and not exceeding 65 degs., till the substance of the stone is indurated ; and after this crisis from 65 to 70 degs. may be allowed. This is to be understood as referring to the application of fire-heat. Even in the total absence of the latter, sun-heat will frequently raise the temperature much higher ; but in this case a large portion of air should be supplied, not, however, all at once after the temperature of the house is found too high, but gradually as the temperature increases. Air should be always freely admitted through the day when the weather is at all favourable. (*Loudon's Suburban Gard.* 473.)

As it is injurious to subject the peach to a high day temperature during its blossoming period, so is it still more injurious to allow it to endure a high *night temperature*, at any time of its growth. We have had it as low as 34 degs. without any injury, both when the trees have been in blossom and when the fruit has been as large as small marbles ; and we are quite sure that from 40 to 45 degs. is the best night temperature during all its periods of growth. Some gardeners, however, use considerably higher temperature ; but although they obtain a ripe crop somewhat

earlier occasionally, yet it is always accompanied by a greater risk of total failure, and a certainty of having low-flavoured fruit.

Mr. W. Hutchinson, gardener at Eastington Park, is one who employs higher temperatures. His directions are to bring the trees into the house in mild weather, generally during November, a little earlier or later, according to the state of the weather ; but not to start them all at once. The last lot are not put in until the 1st of January ; any later than this would not answer, as the weather, if clear, is then hot through the day. He commences forcing them at 55 degs. at night, allowing the thermometer to fall to 50 degs. in the morning, if cold ; but, if the weather is mild, never to fall below 55 degs., and from that to 60 degs. is the usual temperature kept up throughout the period of forcing during the night. During the day, he makes up for low night temperature, when he has the chance, by sun heat. He is not fastidious about a few degrees ; to get it high enough is the main point—say from 70 to 85 and 90 degs., until the fruit is stoned ; then keep them very hot during the day, viz., from 95 to 105 degs., and sometimes even as high as 110. Of course a great deal of moisture is required with this high temperature ; syringe over head twice a day, and sometimes oftener, when the air is dry ; you will seldom be troubled with either green-fly or red-spider. (*Gard. Chron.* 1844, 747.)

We confess ourselves somewhat alarmed at the free way in which Mr. Hutchinson deals with high temperatures. We do not doubt that he has been successful, but we much doubt whether all other parties will be so good root managers, and prove as successful as Mr. H. They are certainly temperatures which we should not indulge in without a necessity: still we should protest against any set rules which should proscribe an advance of a few degrees when a great amount of solar heat existed. Much depends on a good root, and much on the general amount of solar light at any given period. Above all, we say, be moderate at night; we have seldom known houses too low then.

Borders.—This subject has been fully considered whilst giving directions for wall culture, and we have nothing very particular to add to those directions for the formation of borders. Drainage is the first and most important consideration.

Pruning and Training are also the same as required for walls.

Disbudding.—Even under the best and most careful management, the peach-tree grows weaker when cultivated in a hot-house than when in the open air. To obviate this, and consequently to promote its strength, it is desirable to adopt every legitimate means, and foremost of these is disbudding. Mr. Liddiard judiciously directs, that, when the fruit is

about the size of peas, disbudding should commence, leaving very few shoots more than would be required for producing the following years' crop ; he first thins when the fruit is about the size of a hazel-nut, then when it is the size of a walnut, and lastly when the stone becomes hardened. The distance at which each fruit should be left depends upon the health and state of the tree. When the fruit is stoned, he raises the temperature to 60 degs., but gives little or no water until this has happened, when it may be supplied plentifully ; air is freely admitted as the fruit ripens, and some leaves removed to expose it to the sun, to increase the flavour, and to acquire a high colour. (*Ibid.* 1841, 198.)

Mr. Liddiard's practice is very good on the whole ; and we must add, that disbudding and stopping are of more importance, if possible, indoors than on the open wall. The disbudding indoors should (as before observed with regard to wall culture,) be performed a little at a time and frequently. Indeed, we disbud a few shoots almost daily when the fruit are swelling from the size of peas to that of a hazel-nut. Stopping, moreover, is equally important, providing any gross shoots arise. Such will assuredly rob the weaker parts of the tree if permitted to grow unstopped. This we think better than so much winter pruning, and may be termed a preventive system.

Stopping.—As soon as you perceive the least

change towards ripening in the fruit, stop the points of all the young wood, with the exception of a few of the weakest shoots at the lower part of the tree, and these keep growing until the end of the season, in order to get as much sap in them as possible. In the course of their ripening, abundance of air is to be given both night and day, and every leaf which shades the fruit is to be entirely removed. They cannot ripen too slowly ; the slower they ripen, if not absolutely starved, the better. Syringing is of course to be withheld altogether, as well as steaming, but as soon as the last fruit is gathered, the tree should be completely battered with water morning and evening, and the house shut up early in the afternoon, with a thermometer of ninety to ninety five degrees of sun-heat when it can be obtained, and this course persisted in until the leaves turn colour, when the heat by sunshine may range even higher still. By these means the wood is most completely ripened, and in pruning cuts more like oak than peach-wood. During all the ripening process the border inside the house should be allowed to become dry ; in fact, water entirely withheld from the moment the least appearance of change in a single peach is perceived towards ripening. (*Hort. Soc. Trans.* ii. 362.)

Watering and Syringing.—One essential for securing vigorous production in the peach-house is to have the roots of the trees well nourished. If these are

not duly supplied with moisture and food during the time the fruit is setting and swelling, a failure of the crop is inevitable. To secure such a supply, it is a most effectual treatment to give the border a top-dressing, at the close of February, of charred turf. Water, of course, must be given also, as the dryness of the soil and appearance of the trees indicate is necessary.

From the period that the fruit begin to swell off until they commence ripening, the trees must have most copious syringings and steamings, excepting that in the months of February or March, in cold dull weather, you must be a little more niggardly of water, taking care especially that, if you syringe in the afternoon, it is done early, so as to have the leaves dry by the evening; for a temperature of 34 to 40 degs. by night and a wet leaf would by no means agree.

Impregnation.—When the blossoms are well opened, impregnation should be assisted by applying the pollen to the stigma by means of a camel's-hair brush.

This is a crisis which requires some particular attention. The best way is to increase the temperature slightly, especially in the day time, and to give a freer circulation of air. The fires should be encouraged early in the morning, and as much air given betimes as will expel the confined damp; for, although a certain amount of moisture in the atmosphere is neces-

sary, especially during the night, to enable the flower bud to burst its bonds, yet, as Mr. Paxton long since urged, dryness is indispensable to the dispersion of the pollen. After a lively day of this kind, our practice is to give a slight syringing about four or five o'clock in the afternoon, and to take away all air immediately, resuming the practice in the next day before detailed. As soon as they are out of blossom we syringe them as freely as before, and, indeed, endeavour to produce abundance of atmospheric moisture. We thus proceed to the period of disbudding, which will extend over some three weeks, steadily increasing the day temperature, but using great moderation in the night. Indeed, the day temperature must not be hedged in with any dry rules, but, in the main, regulated by the amount of light. As soon as the first swelling is completed and the stoning commences, we suffer the extreme points to extend somewhat freely without any stopping, unless in case of great luxuriance, still keeping up a sweet and somewhat moist air by frequent syringings, sprinkling floors, &c.

Watering the Borders.—This is a very important matter. If the borders had a proper watering at the period of closing the house, little more will be needed until the fruit is in rapid progress during the first swelling; in fact, when the fruit are as large as nuts. Liquid manure will then be of service, providing the

border is sound, and a healthy action of root is known to exist. We use guano water after the rate of six ounces to a gallon, blending therewith soot water, both highly clarified. The latter can scarcely be too strong. They will require such applications on the average about once in a fortnight up to the period when the last swelling commences, increasing the amount progressively. When the fruit begin to change, watering must immediately be withheld, but resumed again as soon as the last peach is gathered. More facts bearing on this part of the question will be found both in the preceding and succeeding matter.

Prevention of Bruised Fruit.—When it is quite ripe, the border should be covered with moss, or some soft substance, or nets suspended under the trees, to prevent those which drop off from being bruised; but the best flavour is obtained by gathering the fruit a day before it is dead ripe, and ripening it for twenty or thirty hours in the fruit-room. (*Suburban Gard.* 476.)

Removal of Glass.—It was the old-fashioned system to remove the sashes from the peach-house so soon as the fruit was ripened, and many ancient gardeners went the length of stating their conviction that the trees would cease to be fruitful unless they were thus exposed. That theirs was an erroneous conviction is proved by the fact that Mr. Errington, who is celebrated as a successful peach-grower, has peach-

trees in full vigour and productiveness growing under glass which has never been removed since they were planted.

Notwithstanding this, it is still a custom with many gardeners, when they have gathered the crop from their peach-house, to remove the sashes immediately and expose the trees to the open air. Though this is a common practice, we cannot imagine for what purpose it is done, or how peach trees can be benefited by being exposed to the air; it is not because the wood ripens sooner, or better, that the sashes are taken off; for neither of these effects can be produced by such treatment. We have, up to the time the fruit is gathered, treated the trees more like tender exotics than any thing else: for months they have been used to a warm humid atmosphere, many degrees above the temperature of the external air; their shoots and foliage are consequently tender, the sap is flowing rapidly and thinly, and the trees are luxuriating in a tropical climate. Suddenly, the sashes are removed, and they are subjected to all the vicissitudes of a British climate, exposed to the "pitiless storm," the cold nights, and all the variations to which our climate is subject. A diminution in the temperature, of course, causes a diminution in the flow of the sap; the growth of the tree is partially arrested, and it does not regain its vigour for that season. These checks must have a most mischievous effect on the health of

the trees : it is certain that the wood is never perfectly ripened under this treatment. Thus trees that are forced in hothouses never last so long as those that are planted out of doors ; and the gardener frequently finds it necessary to give his plants, at least such as are forced early, “ a rest ” for one year ; that is, he does not force them, but leaves them to nature for a year, excepting the disbudding, pruning, and other necessary operations which they may require. Very fine fruit is grown in houses from which the sashes have been removed immediately after the fruit has been gathered ; but it requires no little skill to keep the trees in a healthy and bearing state. We must admit, too, that there are other circumstances prejudicial besides taking off the sashes, which tend to decrease the vigour of the trees ; but we think their removal to be the principal one. Unless, then, the sashes should be particularly wanted for some other purpose, we recommend their being kept on the house. Air may be admitted pretty freely during the day-time ; the trees may have a good watering over head two or three times a week, which will keep the leaves clean and enable them the better to perform the important functions allotted to them. When, however, the trees begin to exhibit symptoms of having completed their growth for the season, the syringing had better be discontinued. By these means the trees will go on regularly adding new

matter to the heart-wood, which, at the time of pruning, will be found hard and well-ripened, and with much less alburnum than those trees that have been exposed to wind and weather throughout the autumn and winter. (*Gard. Chron.* 1842, 494.)

There is certainly no real necessity for taking the roof-lights off, as is proved by daily experience. Nevertheless, if a house of the kind was not wanted for other purposes, we should have no objection to it, providing the trees were prepared for it by a gradual lowering of the temperature for a week or two previously, and providing, also, it was fine weather. The only reason we have, however, is, that in indifferent or cloudy periods the leaf would enjoy a greater amount of light, which we hold to be of great importance.

Winter treatment.—After the winter-pruning, immediately stop every wound, whether from pruning or from accident, with a coat of thick white paint; this is to be repeated on all the larger wounds. The wounds being dressed, immediately stove the house with sulphur blended with sawdust, and burnt in shallow pans; and afterwards dress the tree two or three times with soft soap, sulphur, and tobacco-water, brushing it carefully into every bud and crevice with a painting-brush. This mixture is not made so strong as recommended by some gardening authors, as Mr. Errington depends much on the careful brushing and flooding every part of the tree.

After the above fumigating and washing, about the middle of November, the shoots should be pruned and tied in, the borders lightly forked over, a little charred turf put on them inside, and some long litter, a foot deep, on the border outside, to protect the roots from frost.

Other systems.—Having given the results of our own experience, whether originally our own or confirmatory of the practices of others, we will now give the modes of forcing adopted by Mr. Henderson and Mr. Mearns, not because they differ from our own, but because they offer some useful hints.

Mr. W. Henderson, gardener to W. F. Campbell, Esq., of Lanark, directs the peach-forcer to shut up the house about the 1st of December. If the weather be mild, apply no fire-heat for two weeks; but if it be frosty, put on a little fire every night. In the course of four weeks the buds begin to swell; being at that time able to distinguish the best buds, prune and cut away as much as possible of the wood that bore the fruit last season, and tie in the young shoots that were made in the course of the summer. These shoots were allowed to grow upright, and were not tied down till this time. Cut out all the worst shoots, and leave none except those that are well-ripened, and full of perfect and strong flower-buds; these shoots shorten from fourteen to six inches, according to their strength, always observing to cut

them at a leaf-bud. Lay in the shoots that are to bear the peaches, from six to nine inches apart ; after the young wood is all tied in, go over the trees, and rub or cut off a great number of the flower-buds, carefully observing to leave the best and strongest. When the peaches are set, and about the size of peas, give a gentle sprinkling over the leaves with water once every six or seven days in the forenoon, in order that the leaves may become dry before night ; about the middle of March sprinkle the trees in the afternoon, this keeps the air in the house moist and kindly through the night. The trees now beginning to make wood for next year's crop, go over them with care, and rub off a quantity of the young shoots, observing to keep those which are left in a kind of regular order, none being preserved except where there is room for them. Do not tie in these young shoots that are left for next year's crop, but allow them to grow upright with their tops to the glass ; by this means you do not crowd or disturb the shoots whereon the fruit is growing ; there is sufficient of sun and air between these young upright shoots to ripen the peaches, and give them both fine colour and good flavour. As the season advances, give the trees a good sprinkling over the leaves, twice every week, between four and five o'clock in the afternoon, in order that they may get the benefit of the water through the night ; continue the sprinkling while warm sunny

weather continues, but if the weather happens to be dull and cloudy, discontinue the sprinkling till warm sun returns. About two weeks after the peaches have taken the ripening swelling, stop the sprinkling, give the house a great deal of air, and keep no fire-heat through the day; but, if the weather be dark or wet, put on a little fire every night. If the weather happens to be warm and dry, give the house air through the night, and no fire-heat. (*Hort. Soc. Trans.* vii. 210.)

Mr. Mearns does not approve of the Dutch method of resting the trees every alternate year, and considers the practice is a bad one, as the tree once forced, when due attention has been paid to the roots, is in the best state for early excitement again; a tree taken direct from a wall not so, as it is excited two or three months before its natural season. If a judicious attention be paid to the roots, the same tree is far more successfully forced for a great many years. A late gardener to Lord Stafford told *Mr. Mearns* that an amateur clergyman near Norwich had successfully forced the same trees for more than thirty years. His practice was to take them up every season as soon as they had done growing, and to plant them against a northern aspect till the end of November, and in the mean time to clear all the soil from his border, and fill it again with well-prepared compost. His usual time to commence forcing was the beginning of January. *Mr. Mearns* had a small house erected for the experi-

ment at Shobdon Court, many years ago, to try the practice, and followed it up for two years with success; but the removal of the trees is unnecessary, as, with a due attention to the roots, the following method answers better, and is attended with much less trouble and expense than the above. There are few gardens that have so much north walling to spare, and a better end is obtained without the sacrifice. Confine the roots of the trees for forcing within a walled border of from four to six feet wide, according to the extent of surface which is desired for the trees to cover, and from sixteen to eighteen inches deep. The soil which is used to plant in, nothing else than the perfectly fresh turfy top from a good mellow loamy pasture field, coarsely chopped up; and if the trees are of a proper age, the crop will be as fine the first season as at any future period. Water plentifully, but judiciously, in the swelling season; but more plentifully in the last stage of swelling, and then the fruit will swell off to a fine size, if the following attentions are paid. As soon as the fruit begins to change colour, leave off watering the roots almost entirely, and none over the leaves and fruit till all is gathered; at the same time exposing them as much as possible to the direct action of the sun's rays and atmospheric air, till all is gathered; and that you may lose no time in forcing, by so much exposure to the atmospheric air and direct rays of light, allow the house to

be very hot in the morning before giving air ; and then give it by degrees, till the roof is completely thrown open ; and again, unless rain falls, do not shut up till late in the day, and then in sufficient time to allow of having a high temperature, either with fire or sun, so as to accelerate the forcing, till you commence gathering, at which period, if you have enough for the demand, keep all as open and exposed as possible, only sheltering from rain to the last, when you remove the lights, wash the trees several times powerfully, and give a good soaking to the roots, with soft, rain, river, or pond water. Renovate the roots every three or four years, by taking off six or eight inches from the top of the border, not even sparing the small roots ; and also a foot or eighteen inches from the extremity of the border, so as to clear away all the roots matted against the wall, and fill up the trench as at first with fresh turfy soil, and forking a portion in amongst the roots over all the border, so as to raise it a little above its former height ; by this practice the trees are sufficiently renovated for three or four years more, and do not receive such a check as by the Dutch practice. No tree will thrive, whatever the soil may be, if insects and moss are suffered to harbour upon them, and the best time to remove them is just when the winter pruning is over ; then go over every tree about the houses and walls, in the most careful manner ; first scraping off all possible extrane-

ous matter, after the trees are taken from the trellis or wall, with the following composition :—The strongest drainage of the farm-yard one gallon ; soft-soap 1 lb. ; flowers of brimstone 1 lb. ; mix ; let all stand for several days, stirring the mixture three or four times a day ; get ready some finely-sifted quicklime, and stir into it, till of the consistence of good stiff paint, when it is ready to be applied ; its effects are certain and excellent. Lay it on with painter's sash-tools, of different sizes. Coat over, carefully, every part of the tree so effectually, that not a bud, chink, or crevice escapes the mixture. Use the whitest lime for the hothouses, as, when dry, you can see any axil of a bud or crevice that may have escaped the first dressing ; and to make sure, go over them two or three times. After such a dressing, all animalcules are so completely destroyed, that neither green-fly, thrips, scale, or red spider, are to be seen during the season. As white lime does not look sightly upon wall-trees, either mix soot with it, or else use the mixture without either the soot or lime. (*Hort. Soc. Trans.* ii. 37.)

Peach Trees and Vines together.—Although, as we have said, it is difficult to force these in the same structure, yet the difficulty is not insurmountable. They are so forced at the Earl of Jersey's ; and Mr. R. F. D. Levington gives these directions for carrying it out. Where he so cultivated them the house

is forty feet long, by sixteen wide. It is heated by one furnace, situated at the east end. The first course of heat is carried immediately under the pavement to the front flue, by ascending into which, it rises one foot in the angle, two feet from the front, and the same from the end walls. It is carried along this flue thirty-six feet, descends under the pavement at the west end, and again rises two feet perpendicularly into the back flue, five feet from the end wall, and four from the front flue. This part of the flue is thirty feet long, and descends in like manner under the pavement at the east end, through which it passes into the chimney situated immediately over the furnace. It thus makes a circuit of one hundred feet, chiefly round the front half of the house. The stage occupies a space of thirty feet by eight, leaving a space of five feet at each end, which, by a partition of ornamental lattice-work, the full height of the glass and width of the stage, forms these spaces at each end into two very neat lobbies. These are appropriated to the growth of the finer sorts of climbing plants; and the stage is capable of containing from 800 to 1000 plants in pots. The peach-trellis occupies the whole length of the house, and contains a surface of 280 square feet, to which the trees are trained. The front wall is arched, and a prepared peach-border is made for the roots, two feet wide inside, and eight feet wide outside, and four feet deep. A shelf of

eight inches width is erected immediately under the sloping rafters in front, principally for the purpose of holding strawberry-pots, the fruit of which may be brought to perfection here at any season, with very little trouble. At other times the shelf may be useful in holding Cape bulbs, seedlings, and other dwarf plants. The vine-border is at the back of the house, whereby the site in front is gained for a peach-border, without the vines in anywise interfering with the growth of the peach-trees; and as vines seldom produce any fruit below the top of the upright rafters, which is the only space occupied by the peach-trees, the space occupied by them is entirely gained in this over the usual arrangement of hothouses. The pavement of the gangway is in front of the stage, which allows a space of three feet between the back flue and peach-trellis, elevated eighteen inches above the level of the lobbies, and the same length of the back flue and stage, thus affording an easy command over the stage and peach-trellis, and ascending by two steps at each end. Supposing the house to be now filled with the proper quantity of vines, peaches, and greenhouse plants; in the autumn, as soon as the vines are ripe, they should be let out of the house, by sliding down the lights, one at a time, in the fore part of a mild day, and the vines fastened carefully to the back wall, there to remain during the winter, or until the time of forcing arrives, when they may be taken in again, ob-

serving the same caution as before. The usual progressive degrees of heat are then to be attended to, as in the ordinary mode of peach forcing, which is the principal object here to be attended to, and such will perfectly suit the vines. By the same progressive stages of temperature, the ornamental plants will flourish and produce early flowers, which may either remain in the greenhouse, or be successively removed to decorate the drawing-room, &c. About the middle of May the plants will be turned out for the summer, and the stage may then be appropriated to dwarf vines in pots, figs, balsams, and other tender annual plants. (*Cal. Hort. Mem.* iv. 576.)

Although such may be accomplished, yet, we cannot but regard it as a retrograde step in the art of forcing. It is seldom that the trees endure long under such treatment, for it is obvious that a continual compromise must be taking place.

POT CULTURE.

FORCING the peach in pots is a most excellent mode, not only because it enables a succession to be obtained with least trouble and expense, but because it enables this fruit to be forced even where there is no regular peachery.

The fundamental rules to be kept in mind during

this mode of forcing are, 1st, that you must begin with maiden plants—that is, trees three years old from the time of their being budded, that have not borne fruit; 2ndly, that you use the smallest pots you can, every year, consistently with the size of the plants; and 3rdly, that you shift annually, disturbing the roots as little as possible, but removing the old soil as much as is consistent with this care.

The following directions for this mode of forcing are furnished by Mr. W. Hutchinson, gardener to E. J. Shirley, Esq., at Eatington Park:—

Procure good maiden plants, as soon after the leaves fall in autumn as possible; pot in sandy loam, enriched with one-fourth well-rotted sheep or cow-dung. Have three sizes of pots; the smallest 12 inches wide at top and 11 inches deep inside; the second size, 14 inches at top and 13 deep; the third size, 17 inches at top and 15 deep. After the plants are potted, plunge them in leaves, or any other litter, to save the roots and pots from the frost. If a pit or frame can be spared, it will be better to start the plants there the first year than to put them into pine-house heat at once. Cut down the plants to four or five eyes, and they will make as many shoots the first year. Place the plants in the pit or frame about the 1st of January, increasing the heat gradually, as the plants grow, to make the change to the pine-house as imperceptible as possible. All that will be required

during the first year is, to keep the plants clean by daily syringing, and to water at the root as necessity requires, and occasionally with liquid manure. When the trees have ripened their wood, let them be taken out, and placed behind a north wall. In September they may be shifted into the second-sized pots, picking off a little mould from the top and sides of the ball of earth. This will complete the first year. In January of the second year, place the plants in the pine-house at once. In pruning, cut in the shoots a little, according to their strength. If the plants have made good wood during the first year, they may be allowed to bear a few fruit during the second year. Water and syringe as formerly, till the wood is ripe; then take out the plants to their former situation behind the wall. By this time, if the trees have been managed properly, they will be fine stocky plants. Shift again in September; those that have grown strong, into the largest-sized pots; others, that may not have grown very vigorous, may be placed in the same pots again, after reducing the ball sufficiently to admit of a supply of fresh mould. This will complete the second year. Now, as the plants ought to be fit for work, put them in on December 1st of the second year. Syringe every morning with tepid water; keep the floor of the house damp by watering, and raise steam frequently by watering the flues or hot-water pipes. This must be particularly attended to. Keep

the temperature as low during the night, in December; as you can, consistently with keeping the pines in health, about 55 degs. Fahr.; from 5 to 10 degs. higher during the day; with sun, 10 to 15 degs. higher. Little or no air will be required during this month, unless the weather be very mild indeed. While the plants are in flower, syringing must be dispensed with, and great caution used that too much fire be not applied. One night's neglect at this stage will blast your hopes for one year. Sixty degrees at night during this time will be enough; and 75 degs., with sun, will not be too much during the day. As the season advances, after the fruit are set, keep about 65 degs. at night; sometimes, on mild nights, a little higher; on cold nights, somewhat lower; but during the day, with sun, push them on now from 80 to 85 degs., till the fruit are stoned, and begin to smell; they will then stand a strong heat, 90 to 95 degs., and even to 100 of Fahr.; but recollect that abundance of moisture must accompany this high temperature. Keep the passages and pipes watered often. In watering, give it in small quantities, sufficient to keep the trees moderately moist, till after the fruit are stoned, when give it very plentifully, keeping the roots quite wet till they begin to ripen. Then cover the surface of the pots with moss, to save watering, giving as little as possible till the fruit are all off. (*Gard. Mag.* vii. 321, N.S.)

The temperatures employed by Mr. Hutchinson are as follow :—For the first it is kept at 55 degrees during the day, and afterwards as near 60 as possible, and when the sun shines air is sparingly admitted, but it would be more freely if it were not for pines being cultivated in the same house. During March, after the fruit is set, the day temperature is from 80 to 85 degs. ; but after the stones are formed, from 90 to 100 degs., but the night temperature never above 60. Trees have been thus forced until they were 16 years old, and will continue longer probably. (*Gard. Chron.* 1843, 267.) By employing such high temperatures, Mr. Hutchinson gathered ripe peaches on the 7th of April, though forcing only commenced on the 25th of November.

Facts are stubborn things, or we certainly should have hesitated before we recommended such very high temperatures. That peaches will endure a great amount of heat, we are perfectly aware ; but such a great amount of night heat is certainly unknown in our practice. Mr. Hutchinson has, however, it would appear, been successful. We would advise those beginning to try their hand at peach-forcing in pots to be content with a much more moderate amount—at least for a season. We are very partial to high temperatures during sunshine, provided a due motion or circulation of air is kept up, with some little moisture of a permanent character in the atmosphere. High

night heat will, we think, of course accelerate the ripening of the fruit, but assuredly it will be at the expense of the flavour. It should be borne in mind by all parties desirous of forcing good peaches, that much of our early forcing practised in these days is moulded in regard of temperatures by the great exhibition days in London. Therefore those who do not grow for exhibition purposes, may frequently steer a more moderate course.

Mr. Hutchinson, we see, advises a sandy loam. Surely a sound and somewhat tenacious loam will prove more durable. We would strongly advise the use of chopped turf, about six months old, for this purpose, handled by spade, but by no means by the riddle. We are somewhat surprised that neither turf nor liquid manure are named in Mr. Hutchinson's paper; the importance of these materials is now universally recognised both in horticulture and agriculture. Having tried, and, we think, proved, the utility of bone manure, we would recommend a portion to be used in the peach soil. What is termed boiled bone is the kind we use, and is chiefly composed of phosphate of lime. Be that as it may, we have frequently found strong and healthy roots pierced through the lumps. It should be of the character termed by the salesman "half-inch bone." The fine should be rejected, for it will only serve to block up the drainage, and is, we suspect, too powerful in its

immediate action for the young fibre. We would advise the strength or tenacity of the soil to be increased progressively with each shift, beginning with a somewhat sandy loam for the maiden plants, and using a loam of sounder character, and in rather larger masses at each successive shift. The drainage should be so complete that no subsequent waterings may by any means disarrange it; more especially if liquid manure is systematically used; which, however clarified—which it assuredly ought to be in all cases—has a continual tendency to close the pores of the soil, and of course to impede drainage, and exclude the beneficial agency of the atmosphere.

We would now add a remark on the very high ripening temperatures employed by Mr. Hutchinson, and to express a fear, that such will in general be accompanied by inferiority of flavour. This is not peculiar to the peach alone, but will be found to hold good with the melon, the strawberry, and even the grape and the pine apple. The elaboration and chemical changes necessary, in order to give high flavour in fruits, requires a given amount of time, in order to bring into play the whole capabilities of the plant.

The system of fruiting the peach in pots in pine-stoves is not to be generally advised; that it may be accomplished, Mr. H. has shewn, and indeed it is no novel affair. Some compromise must, however, un-

avoidably take place, for the pine in its own nature requires at least twice the amount of atmospheric moisture on the average that is advisable for the peach. In these days of cheap glass, it would be much better to build very small houses or pits. Such would answer either as lean-to's or in the span-roof form, and might, for economy's sake, be so compact, that all the operations necessary might be performed from the outside by means of light sliding sashes; the building of course sunk very low. There would be no necessity for a walk inside, unless desired by the proprietor. The preservation of walks in the interior of forcing structures often leads to much needless expense.

Throughout the whole course of peach forcing, by whatever mode or in whatever structure, much atmospheric moisture must be secured, that is, providing much artificial heat be indulged in. The only exceptions to this are two periods: the one whilst blossoming, the other whilst in the ripe state. For pot culture, we apprehend that severe economy will, at times, still cause them to be grown in pine-stoves, or mixed up with other forcing. When such is the case, it will be expedient, after the fruit is gathered, to use sulphur liberally on the the back of the leaf, provided the red spider has commenced operations.

DISEASES.

PLANTS, like animals, are liable to disease just in proportion as they are made to live in a climate differing little or much from that of the country in which they are natives. The climate of Persia differs greatly from that of Great Britain, and, as a consequence, the peach is here subject to peculiar diseases unknown as its ravagers in his native habitat. The chief differences between the climates of the two countries are the greater wetness of that of Great Britain, and the greater vicissitudes of temperature during its summers. To these differences may be traced the origin of all the diseases to which this fruit-tree is liable.

Gumming is an issue or extravasation of the sap of the peach tree, arising usually from its being formed more rapidly than it can be conveyed away by the sap vessels. When this occurs rupture must take place, for the force with which it is propelled during circulation, and consequently the force acting to burst the vessels during any check, is very much greater than could have been expected, before Mr. Hales demonstrated it by experiment. Now, we know that a much less pressure than any of those he ascertained would be capable of bursting the delicate membranes of any of their exterior descending sap vessels, and it is in such outer ducts that the injury first occurs. When one exterior vessel is ruptured, that next be-

neath it, having the supporting pressure removed, is enabled to follow the same course at the same locality ; and in proportion to the length of the time that the sap continues in excess, is the depth to which the mischief extends, and the quantity of sap extravasated. If the extravasation proceeds from this cause, there is but one course of treatment to be pursued ; sever one of the main roots to afford the tree immediate relief, and reduce the staple of the soil by removing some of it, and admixing less fertile earthy components, as sand or chalk. This must be done gradually, for the fibrous roots that are suited for the collection of food from a fertile soil are not at once adapted for the introsusception of that from a less abundant pasturage. Care must be taken not to apply the above remedies before it is clearly ascertained that the cause is not an unnatural contraction of the sap vessels, because, in such case, the treatment might be injurious rather than beneficial. We have always found it arising from an excessive production of sap, if the tree when afflicted by extravasation produces at the same time super-luxuriant shoots. (*Johnson's Principles of Gardening.*)

Professor Lindley, with his usual ability, has traced the progress of this disease as follows :—Gum is the basis of vegetation, and he would not be very wrong who should assert that the whole framework of a plant is a skeleton of gum. This substance seems to

be formed by the decomposition of carbonic acid amongst water, with whose elements the young carbon combines. The first secretion that we find in a young seedling is gum, and out of that gum the organs of the tender plant are fashioned by the vital force. The first secretion that is formed by a full-grown plant, when it is roused from its winter's torpor and begins to grow, is gum, which in trees oozes out between the wood and bark, as cambium, causing the latter to "run," and enabling both those parts to increase in thickness. Gum also lubricates the delicate organs which are formed in the leaf-bud, and lengthen into leaves and branches. But as plants grow old gum disappears, the proportions of its element change, and it assumes the new forms of starch and wood, or it simply loses the water that dissolved it, and becomes a hardened coating to the minute cells and tubes of vegetable structure. When it is completely changed, or hardened, wood is said to be ripe; on the contrary, when it remains in the very state of gum, and still retains its water, wood is called unripe. In the former condition it offers great resistance to changes of temperature, suffering but little either from heat or cold, and it gives birth to branches firm and healthy like itself, because they are fed by a healthy mother. In the latter state, (that of unripeness,) it is extremely sensible of changes of temperature, its fluid expanding with force on either side of 40 degs. of Fahrenheit's scale, and

it brings forth sickly watery branches, because it cannot give them their duly-prepared supply of food. The point to be gained, then, is to secure the conversion of gum into some more dry and solid form of matter. This is the more important in a peach tree, because that plant, like all stone-fruit trees, naturally produces gum in excess, and it wants the power which many plants possess of rapidly converting it into something else. How is this to be done? Gum is converted into starch or wood by the loss of a portion of the water in combination with it. A loss of one part of water in eleven produces starch, and of three parts in eleven produces wood. A separation of the water of combination is produced by heat and light, and by no other known agents. In proportion as the branches are heated and exposed to bright light are starch and wood formed at the expense of gum; we may also conceive that, in a similar proportion, unchanged gum is dried off by the evaporation of its water of solution, and *vice versa*. Now, one of the first means to effect this end is to take care that no more wood is produced than can be fully exposed to sunlight; and that all such wood is continually nailed close to a wall, whenever it is long enough to be so secured; in order that the reflected heat of the wall may be absorbed by the branches. All the systems of leaving fore-right shoots, or of putting off summer pruning till the winter, and tucking in the

summer growth, according to the ignorant school of Forsyth, are in the most direct opposition to the ripening process, or, in other words, to the conversion of gum into starch and wood. This explains why peach trees grown in the open gardens of a nursery, where the temperature is low, are so peculiarly subject to gum. But all the exposure, thin training, and other expedients that can be thought of, in order to place the peach tree in a situation similar to that of its own Persian climate, will fail, if the roots are permitted to suck up moisture too abundantly from the soil, or if the air is so damp as to hinder the ready passage of water through the leaves. In order, therefore, to secure the ripening of wood, these points also are to be sedulously attended to. The border must not only be at all times well drained, but in localities where the air is inevitably very moist, and where, therefore, the leaves are incapable of perspiring copiously, the border must be maintained so dry that but little moisture shall find its way into the system of the trees ; for, by so doing, the leaves, which have little power of action, in consequence of the dampness of the air that surrounds them, will have little occasion to exercise such power as they possess ; and thus a due balance will be maintained between the perspiring powers of the leaves and the absorbing powers of the roots. When these things are neglected, the consequence is, that cold expanding the watery matter of the unripe wood

during winter, will force through the sides of the cells in which is lodged the gummy fluid, which, the moment this happens, loses its vitality and causes a decay of the surrounding parts ; or heat, when the sun beats fiercely on the branches, will produce the same effect—the inevitable result of which will be decay. The proximate cause of “the gum” may therefore be either exposure of unripe wood to the sun, or the action of frost upon it. Another cause, distinct from all these, may be the following :—Suppose that neither heat nor cold are sufficient to damage the unripe wood, the new sap will do it ; for in unripe wood the cells and vessels are filled unnaturally with crude fluid before the new sap enters them ; and the moment that new sap is introduced in addition, they become so distended, that a portion of their contents must escape. That portion flows into the intercellular cavities of the bark, thence finds its way to the exterior, and, having lost its vitality, immediately induces the decay of the surrounding parts. (*Gard. Chron.* 1844, 355.)

Although thorough drainage is a most effectual check upon the occurrence of gumming, by preventing the absorption of too much moisture under ordinary circumstances, yet, despite the best of drainage, this efflux of sap will occur if the soil of the border is allowed to become too dry, and then to be exposed to a fall of heavy rain. The vessels of the branches,

contracted by long exposure to drought, are unable to give passage to the consequent sudden great accession of sap. For such an event there is no remedy, but the preventive is obviously that of mulching and watering, in order to keep the trees in a free-growing state during the dry weather, so that when rain does come a full supply of moisture will be nothing more than what the trees have been accustomed to. (*Ibid.* 1843, 361.)

Gumming, however, also is the mere efflux of the sap from a wound, the best remedy for which is to cut the injured parts out cleanly with a very sharp knife, and excluding the entrance of wet by plastering it over with white-lead, or with a mixture of melted wax and resin. Such wounds frequently arise from the decay of abortive buds, both of wood-buds and blossom-buds. This abortiveness, observes Mr. Pearson, of Kinlet, near Bewdley, establishes itself earlier or later in the autumn, or probably from the vicissitudes of a severe winter. The abortive wood-buds are more numerous in those trees which are rather declining in vigour, or in those branches of a young tree which has been robbed of its portion of nourishment by its more robust neighbours, or, which is often the case, branches which have borne too much fruit. It matters little, however, in this case, how these abortive buds are established; the fact is, they are established, and there the disease commences

its silent but certain and destructive operations. When the buds are dead, they, like all dead vegetable matter, become powerful absorbents of water, whether of the finely-divided vapours of the atmosphere, or the more condensed form of rain-water—hence, after rain, they become gorged with water. So long as these dead buds rest on the trees, there is little or no cicatrization between the dead buds and the branches which they rest on; or, at all events, not before they have been saturated with moisture, which first saturation, after death has taken place, enters into the most incipient fermentation with the sap of the plant, at the connection between the dead bud and the living branch. By the alternations of wintry weather, from wet to dry, and wet to frost, and frost to hot sunshine, as spring approaches, the frost, freezing the water in the dead buds, enlarges their capacity for holding their destructive element, which assists in carrying on the fermentation between the alburnum and the bark. In this infant stage of the disease, it is not discernible by ordinary observation, as the bark does not change its colour for some time after the disease has entered the system of the plant; and, if dry weather follow the recent establishment of it, its ravages are arrested for a time, but which, nevertheless, progress as the sap attenuates, when the disease again, but more plainly, manifests itself.

Another cause for gumming is a local contraction

of the sap vessels, which, preventing the sufficiently rapid progress of the sap, causes it to burst them and thus to find vent above the contraction.

Mr. J. Roberts, of Hampsthwaite, near Ripley, remarking upon the occurrence of this in the peach and nectarine, observes, that the more free-growing kinds, such as the French Mignonne, Royal George and Noblesse peaches, Violet Hative, and other nectarines, worked upon stubborn stocks, are most subject to it, and dwarfs more so than standards. In a few years there are large excrescences at the point of union of the bud with the stock, so that in that time the trees have shewn a premature decay. This arises from the want of reciprocity betwixt root and branch, and all the kind treatment imaginable cannot counteract the consequence. The sap in its downward direction meets a repulse, is propelled upwards into the channels already surcharged, when it procures for itself an outlet, and then gum disease, and a premature decay of the whole plant, is the consequence. (*Gard. Chron.* 1844, 389.)

The occurrence of gumming in the native climate of the peach is, we are given to understand, a rarity as compared with what afflicts it in Britain; and Mr. Errington observes that two great evils in cultivation conspire together to produce it, viz., unripeness of wood and abrasion or laceration of the bark. To these, however, may be added a sort of gangrenous

tendency, induced by pruning over-luxuriant shoots. For the latter we would urge what has before been pressed on the reader's attention, viz. to prevent over-luxuriance, by keeping the root under control from the very first. Secondly, to practise the preventive system of pruning, or rather of stopping; which consists in pinching off the terminal points of gross shoots in the growing season, when four or five buds in length. And thirdly, to make a point of sealing up the ends of the pruned shoots, when the trees are in the rest state, by rubbing white-lead (which is our practice) or other impervious matter on the newly-made incisure.

The influence of wet, together with atmospheric action, is well known, by the practice of generations, to be very inimical to the permanency of this tree. Indeed, we believe that from this, and unripeness in the wood, arise the great majority of evils that beset this highly-esteemed fruit. One passing remark we would here make, and that is, that where the gum unhappily breaks out—be it at what period it may—that it is the best policy to scrape it clean away, without abrasion of the bark, and to put a patch of the white-lead on the blemish whilst in a dry state. This we have practised for years, and the practice may be relied on.

Shrivelling of the Points of the Shoots.—This is almost or altogether caused by unripeness in the young wood, and generally brought about by too lux-

uriant growth, induced by a too liberal use of manures, together with too deep a soil. In our more northern counties this is a somewhat common occurrence ; and young trees purchased from the nurseries of a gross character, and planted in deep and rich soils, will sometimes make shoots three or four feet in length, which looks most flattering until the autumn arrives, when, if it prove ungenial, the points of such shoots wither and decay, and such is not unfrequently termed “ stricken” or blighted.

Now, were the gross young shoots of such trees to have their terminal points pinched off when about nine inches in length, their growth would be much moderated, and the side branches emanating therefrom would be produced in time to become permanent shoots of the future tree. Instead of this, we generally see them permitted to remain their whole length, and only shortened back at the winter’s pruning ; when the side shoots, before alluded to, have yet to be produced ; in fact, a whole season may be said to be lost, and the whole system of the tree rendered more luxuriant than ever. The best mode of procedure in such cases is to take the tree carefully up and replant it with much care, taking care not to bruise the roots, or, if any become injured, to cut them clean away with a sharp knife, always cutting just beyond a tuft of fibres. The latter point we urge because we have found roots pruned back to a bare part always

more inclined to produce suckers, which are a source of some annoyance.

Blistering of Leaves.—Peach trees, especially if growing on ill-drained soils, are excessively liable to have blistered leaves, attended by a contraction of the midrib, and, in some instances, it extends to an unnatural thickening of the upper parenchymatous plate of the leaves. The French gardeners term this disease *la cloque*. We are inclined to the opinion that this disease arises from an excess of moisture being imbibed by the roots. An effort is made by the tree to enlarge its leaves for the elaboration of this excessive and diluted supply of sap, and in the effort the parenchyma of the leaves extends more rapidly than their ribs. Contortion is thus unavoidably induced. In a similar mode the pulp or parenchyma of the plum and cherry cause their cuticles to burst in wet weather. Acari frequently make their appearance upon such leaves, but these are attendants upon vegetable disease, not the cause. Thorough underdraining will probably prevent a recurrence of the evil; and in confirmation that the disease arises from excessive moisture, we may observe that the diseased leaves drop off, and none others occur so soon as the dry hot weather of summer is fairly established. Although, frequently, only some trees out of several against the same wall are thus diseased, this proves no more than that the unaffected trees are either

planted shallower, have roots that do not absorb moisture so fast as the others, or have a power in their leaves to transpire it more freely.

Professor Lindley, remarking upon this disease, observes, that when a plant remains in a healthy state, but its leaves are excessively distended with watery matter, the first thing that happens is an increase in size, or number, or perhaps in both, of the green bladders that lie between the veins of the leaves, and which, growing faster than the veins that bound them, form, as Mr. Johnson has stated, excrescences and expansions, presenting the appearance of blisters. This happens continually, in vineries, to vines growing with great vigour, whose leaves will then present innumerable green bags, or bladders, springing up from their surface and deforming them.

The disease of the vine-leaf in a vinery is of the same nature as the blister of the peach-leaf in front of a south wall. There is no essential difference between them; it is only one of degree, that of the peach being the more severe. In both instances the cause is the same; namely, the accumulation in the leaves of watery matter derived from the soil. If this be so, it can hardly be said that cold is the primary cause of the mischief; for no cold is experienced in those vineries where the malady is the most conspicuous. We do not, however, entirely deny the evil influence of low temperature. It is very possible that it

does injure the delicate tissue of young leaves, and render it incapable of performing its allotted office. We believe, moreover, that the evil attendant upon an accumulation of watery matter in the foliage is aggravated by cold, which, no doubt, interferes with the great function of perspiration; for, in a warm climate, the peach would probably throw off its superfluous watery particles as fast as the leaves received them. What we contend for is, that cold must be regarded at most as a mere secondary cause; and that no such mischief as we see produced would arise if the wet of the soil did not overcharge and distend the leaves. It is, therefore, to the border that we should look; and our great object should be to guard the soil of newly-sprouting peach-trees from being suddenly filled with water, even although it is quickly drained off again. In the absence of this, we shall no more, by shades or coverings, prevent the leaves from blistering than we do in the case of vines by glazed roofs; and we doubt much whether, if the border were kept permanently clear of sudden and excessive accessions of water, any considerable amount of blister would appear, even although the leaves were left unguarded to the cold radiation, dangerous as that action is to plants so tender as the peach-tree. (*Gard. Chron.* 1845, 431.)

Mildew, whether on the stems of the wheat, or on the leaves of the chrysanthemum, pea, rose, or peach,

appears in the form of minute fungi, the roots of which penetrate the pores of the epidermis, rob the plant of its juices, and interrupt its respiration. There seems to us every reason to believe that the fungus is communicated to the plants from the soil. Every specimen of these fungi emits annually myriads of minute seeds, and these are wafted over the soil by the winds, vegetating and reproducing seed, if they have happened to be deposited in a favourable place, or remaining until the following spring without germinating. These fungi have the power of spreading also by stooling or throwing out offsets. They are never absent from a soil, and at some periods of its growth are annually to be found upon the plants liable to their inroads. They are more observed in cold, damp, muggy seasons, because such seasons are peculiarly favourable to the growth of all fungi. The best of all cures is a weak solution of common salt and water sprinkled over the foliage of the plant affected, by the aid of a painter's brush, or impelled by a syringe. Dissolve three ounces of the salt in each gallon of water, and repeat the application on two or three successive days, applying it during the evening. Nitre has been employed with similar success, using one ounce to each gallon. (*Johnson's Dict. of Mod. Gardening.*)

Dusting the leaves with flowers of sulphur is also a successful remedy.

The white parasitical fungi, that are either the cause or injurious consequence of the peach-leaf mildew, are *Oidium erysiphoides*, *Sporotrichum macrosporum*, *Torula botryoides*, and *Erysiphe pannosa*. We have little doubt that these fungi never attack plants that are in good health, for we entertain the opinion that it is only the sap of diseased plants—sap in a state of decomposition—that is suited to be the food of the fungi. Prevention, therefore, is preferable to curative applications, and we have no doubt that if the peach tree is kept in due vigour by having the soil well drained, and prevented from excesses of either moisture or of dryness—and if its leaves are similarly protected from being exposed to sudden atmospheric changes—they will never be visited by mildew.

We are justified in this conclusion, because with this disease our peach trees, in the whole course of our practice, (which has extended over thirty years,) have seldom or never been troubled. Mildew of all kinds generally proceeds from an impeded root action, and we have generally found that stagnation suddenly caused, whether by excessive heat or drought, is liable to produce it, more especially if succeeded by much solar light. We have little doubt that in such cases the elaboration (by overtaking or being in advance of the absorbing power) produces more highly concentrated juices, which are adapted as pabulum

for this obscure class of parasites. The best preventive is a good top-dressing of rotten manure in the early part of June, and as soon as drought sets in a thorough soaking of water. If caused by bad and deep borders, the remedy must be sought in thorough drainage, or an entire renovation of the soil.

There is no doubt that some peaches are more liable to be visited by this disease than are others, and those are the kinds which are most luxuriant growers. It so happens that most of these have no glands at the bases of their leaves. This was long since noticed, and again lately commented upon by Mr. Blake, secretary to the Croydon Gardeners' Society. He observed that the kinds which have no glands are all subject to mildew; such as Double Montague, Ford's Seedling, Red Magdalen, Noblesse, Vanguard, Barrington, Grimwood's Royal George, Belle Bausse, and Early Galand. These kinds are all liable to be affected with the mildew, whether planted indoors or out, in any part of England: but then it is soon stopped; a little slacked lime and sulphur vivum settles it. There are a number of peaches, and very fine ones too, that possess glands; some with one, two, or three pairs of ovate, and some with the same number of reniform glands, all of which kinds resist the mildew. Mr. Blake trained the shoots of those with glands over those infected, and they would not receive the infection. (*Gard.*

Journ. 1846.) A fact strongly supporting the opinion we have expressed, that the mildew fungi only attacks those trees the sap of which is already in a state of incipient disease.

Again, Mr. J. Kirk, gardener at Smeaton, says that, if any of the trees are in a stunted or sickly state, he takes away all the old mould from the roots, as carefully as possible, and puts in its place fresh rotten turf from an old pasture, without any dung. Mr. Kirk has done this in many instances ; and all the times that he has practised it, the trees never failed, not only completely to recover their health, but to produce a crop of fine-swelled fruit. (*Caled Hort. Mem.* i 363.)

Blotches in the shoots is a gangrene, beginning in the form of specks, but gradually forming a decayed part, that, like the canker in the apple tree, destroys all the shoot beyond the infected part. It usually attacks ill-ripened shoots, and the only remedy we know of is to lop off those infected an inch or two below the blotch ; but, to prevent the occurrence of this disorder, use every means to ripen the wood thoroughly.

Blotches on the fruit are an induration or hardening of the skin, which seems to arise from its being exposed to sudden transitions of temperature. We never observed these blotches on forced peaches.

Splitting of the fruit arises from the sudden

application of moisture after much drought. This splitting occurs before they begin to ripen, and, to prevent it, it is necessary that the border should not be allowed at any time to become too dry; and further, that too much foliage should not be taken off at once; neither should insects be allowed to injure that which is left. If the trees are thus kept in health in dry weather, the fruit will not be affected when wet sets in. In watering, cold spring water must not be used. (*Gard. Chron.* 1844, 200.)

Splitting of the stones often occurs in late peaches when excessive rain penetrates to the roots of the trees, and there becomes stagnant, after a previously dry season: the stones of the fruit split, and the latter drops in consequence. This will not be the case if the borders have a sufficient supply of moisture throughout the summer, and no superabundance when the fruit is ripening off. (*Ibid.*)

Wounds.—After the winter-pruning, stop every wound made by the knife, and every place whence proceeds gummy exudations, with a coat of thick white paint; this painting is repeated, and perhaps a third time, on all the larger wounds. This is found of eminent use, for it is a tolerably well-known fact, that the entrance of air and moisture into such wounds is in many cases the cause of premature decay. The wounds being dressed in this manner, immediately stove the house with sulphur, blended with sawdust,

and burnt in shallow pans, and afterwards dress the tree over two or three times with soft-soap, sulphur, and tobacco-water, brushing it carefully into every bud and crevice with a painting-brush. This mixture is not made so strong as recommended by some of our gardening authors, as Mr. Errington depends much on the careful brushing and flooding every part of the tree. (*Hort. Soc. Trans.* 360.)

INSECTS.

Aphis Persicæ.—This species of aphid is the earliest to appear in the spring, and, like others of the same genus, is the produce of eggs deposited by its parent in the previous autumn. It usually appears in damp chilly weather, when the air being full of moisture or haze, and associated by the commonalty with their appearance, the weather is said to be *blighting*. The fact that one aphid produces at the rate of twenty-five young ones per day for several months; that each young one begins to multiply as soon as it is born; that one aphid kept purposely in confinement saw nine generations in three months; that one aphid during its life may be the progenitor of no less than 5,904,900,000 descendants; and that the autumn-deposited brood are almost all simultaneously hatched in the spring; are facts quite sufficient

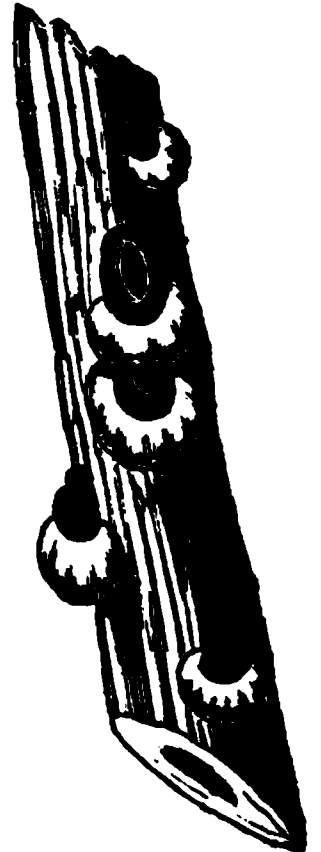
to account for the myriads of these pests which then occasionally appear, without having recourse to the ignorant suggestion that they are engendered by certain winds, or states of the atmosphere.

To prevent their appearance, take sulphur vivum, sifted lime, and Scotch snuff, equal quantities of each ; lamp-black, half the quantity ; mix them to the thickness of paint, with stale brine and soapsuds. With this mixture paint the wall and trees, and over all the buds, very early in the spring, just as they begin to shew colour. We doubt not that this is a serviceable wash ; and if the lamp-black causes an unsightly appearance, clay or some other substance must be substituted, to dilute and increase the bulk of the mixture, which otherwise may be too strong for the trees. (*Gard. Chron.* 1845, 154.)

If the aphides do make their appearance in the spring, syringe the trees on which they are with tobacco-water. Do it two or three times, after intervals of a day or two, and whilst the sun is shining upon the leaves.

Brown Scale appears to be the same as preys upon the grape-vine, (*Coccus vitis*), and like that ~~tree~~ the peach is liable to its attacks both under glass and in the open air. It is, says Mr. Curtis, a longish brown insect, which in old age assumes a blackish brown colour, and becomes hemispherical and wrinkled. The females are shield-like, being convex above and

flat or concave below ; they are furnished with six small legs, which, when the insect is old, become part of the substance of the body. On the under side of the insect is a sucker, with which it pierces the cuticle of the plants, and extracts their juices. Soon after impregnation the female dies, and her body becomes a protection for the eggs, which are covered with long white wool, and sometimes completely envelope the shoots of the vines, or of plants, growing underneath them. The males are furnished with four wings, and are apterous. Their powers of propagation are immense ; and, where they once become very numerous, they are exceedingly difficult to eradicate. This species belongs to the true genus *Coccus*, characterised by the female having a scale inseparable from her body. When young, both sexes are alike, but the male larvæ produce two-winged insects, with two tail threads. The females have no wings, and their dead bodies, beneath which the young are sheltered, appear as in the annexed woodcut. (*Johnson and Errington on the Grape Vine*, ii. 136.)



This is decidedly one of the greatest pests in the peach-house, but, if the trees are painted over every

year at forcing-time with the mixture, according to the recipe of Mr. Kyle, they will be kept down ; the addition of a little glue or soft-soap to the mixture will be found beneficial ; keep a sharp look-out that none are left ; the injurious effects of these pests on the young wood is astonishing.

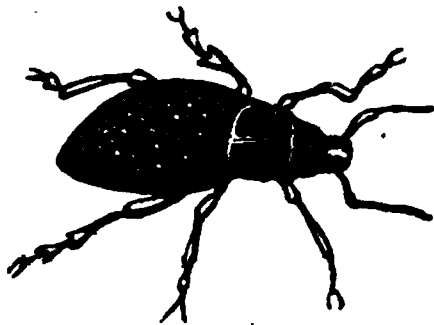
Mr. J. Kyle says that the following is a cure for mildew as well as the scale. Get some tenacious clay, and dilute it with water till it comes to the consistency of paint. To every gallon of the clay-paint add half a pound of sulphur ; mix them well, and paint the trees all over. It will be better to apply two dressings, and the second must not be put on till the first is thoroughly dry. The best season is when the buds begin to swell. To prevent rain washing it off from trees in the open air, it is advantageous to nail mats over the trees, taking them off when the weather is dry. It will require at least a fortnight to kill the scale ; when the clay drops off, it will bring all the scale with it. No mildew will make its appearance till July, and but little then compared with what there would have been without the application. If mildew does make its appearance, syringe the trees with water, and apply flour of sulphur through the rose of a large watering-pot. By dredging it on while the trees are wet, and leaving it on for a week, you will find that the mildew will be conquered. (*Gard. Chron.* 1841, 69.)

Acarus (Erythræus) tellarius.—The red spider.—This pest of the gardener is very rarely found on the peach-tree, and never will occur if the air of the house is kept duly impregnated with watery vapour. Sulphur fumigations and a more free supply of atmospheric moisture will speedily remove and continue to exclude this insect.

The red spider cannot thrive—scarcely exist—where a sufficiency of water is regularly applied. As, however, syringing cannot be persisted in at all times, something else is requisite at those periods, when the syringe is laid by. Sulphur, then, is the best thing at present known for this purpose; but as many persons are deterred from the use of it, through a fear of its pernicious effects, we will here detail our mode of using it, by which we have been kept (we might almost say entirely) free of this pest for the last twelve years. We apply it about three or four times in the course of the year, to each house; the houses are on the average about 30 feet long, by some 16 feet wide, and we use about six ounces to each house each time, applied in the form of thick paint. The houses are heated by hot water, and the sulphur-paint is applied to the under or return pipe alone. The best way is to beat a lump of soft-soap, as large as a walnut, up in warm water; and to add some clay-water, made by working a lump of clay in warm water until the water becomes a thin paint; then to blend

this with the soap water; and finally to mix the sulphur also. The soap and the clay form a body, and prevent the sulphur washing or rubbing off. (*Johnson and Barnes on the Pine Apple*, ii. 128.)

Otiorhyncus tenebriosus.—The red-legged garden weevil.—The maggots of this are found round the base of the stems of wall-fruit, sometimes in very great quantities, a few inches below the surface, where they undergo their transformations. The beetles, which are old offenders, come out only at night to feed upon the buds of wall-fruit, doing great mischief to apricots, peaches, nectarines, plums, &c. They first destroy the fruit, and subsequently attack the bark and leaves, so as not unfrequently to endanger the life of the trees. They commence their depredations in April by eating the unexpanded blossom-buds, clearing out the centre, and leaving only the external bractea, and occasionally fragments of the immature leaves. They will thus proceed along a branch until all the buds are destroyed, and afterwards demolish the young eyes which ought to produce wood-shoots until nothing is left but the bare branches. The



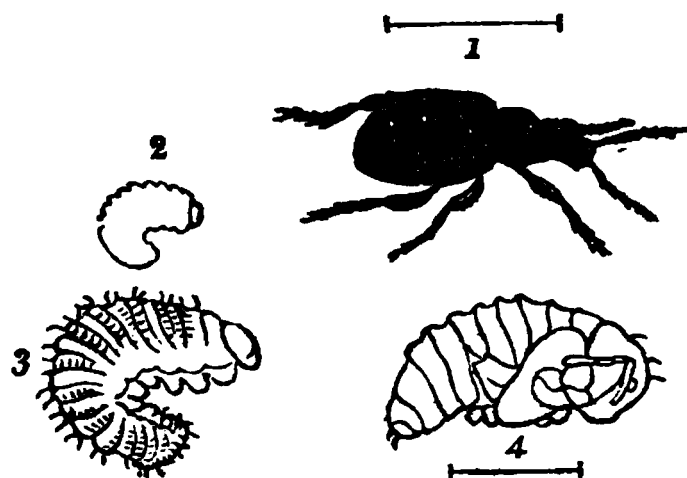
beetles bury themselves by day in the earth, close to the foundation of the wall to which the trees are trained, likewise round the stems of the trees, and most probably in chinks of the bricks, and other dark hiding-places. When recently hatched this insect is clothed with a delicate yellow pubescence, forming little irregular spots upon the elytra ; but they soon wear off and disappear, when it becomes of a shining black, inclining to a pitch colour. The larvæ of these otiorhynchi being as destructive as the perfect beetles, the main object ought to be to destroy the former, if possible, in the autumn, which probably would be most readily effected by stirring the earth all along the base of the wall and round the stems of the fruit-trees, and then sprinkling salt pretty thickly over the broken surface ; or salt and water, or, perhaps, liquid manure, might be equally beneficial—if hot, the better ; for it seems evident, from the peculiar spots in which they generate, or rather undergo their transformations, that situations sheltered in a great measure from the wet are most congenial to their habits. The beetles can only be arrested by hand-picking, with a candle and lantern, and afterwards pouring boiling water upon them, as their shells resist moderate heat. (*Gard. Chron.* 1842, 316.)

Otiorhyncus (Curculio) oblongus.—The Oblong Weevil.—This is of a reddish brown colour. It ap-

pears in May, and feeds on the young leaves of the peach, apricot, plum, pear and apple.

Otiorhyncus (Curculio) sulcatus, feeds upon both the leaves and fruit of the peach. Mr. Curtis describes it as a dull black weevil, with a stout proboscis, at the extremity of which is the mouth; the thorax is granulated, and the elytra are rough, with several elevated lines and minute ochre-coloured dots placed somewhat transversely; it has no wings. The period for the appearance of these weevils depends upon temperature, for May is mentioned by some, and June by others, as the months when they are mischievous in gardens, and in hothouses much earlier. Mr. E. Edwards says that he has seen them in an early vinery at Studley Castle about the end of January, when they make great havoc amongst the young shoots and foliage; and from that time until the end of April they feed upon the buds and leaves, always high up, and never seen in the day. The eggs are deposited a little beneath the surface of the earth, and produce white maggots, and these live at the roots of the tree, rendering the plants weak and sickly; some say about June the maggots change to pupa, whilst others state that they live through the winter, and undergo their metamorphoses in the spring; however this may be, they remain in the chrysalis state only 14 days. The maggots also do great mischief to succulent and other plants in pots,

as well as in the border, such as Sedums, Saxifragas, the Trollius, Auriculas, and Primroses, eating round the tops of the roots and detaching them from the the crown.



1. The Weevil. 2, 3. Maggots. 4. The Pupa. The straight lines show the natural length of the Weevil and Pupa.

Curculio picipes is a most destructive insect in the peachery as well as in the garden. This beetle is very similar in figure to *C. sulcatus*, but smaller, and forms, with about twenty other indigenous species, a genus called *Otiorhynchus*; they are also nearly alike in sculpture, but vary in tint. *C. picipes* being of a clay colour, the wing-cases more or less clouded with darker-coloured spots, and altogether it so much resembles in tone the clods and bark under and between which this insect secretes itself by day, that it is with difficulty detected. In the night these weevils sally forth to feed upon wall-fruit trees and the vines in hothouses, either attacking the stems of the new wood in April, which soon becomes black, or feeding

near the tips of the shoots. Every crevice in old garden-walls often swarm with these weevils. No-



thing would prove a greater check to their increase than stopping all crevices, or holes in the walls, with mortar, plaster-of-Paris, or Roman cement ; and the interior of hot-houses should be annually washed with lime ; the old bark of the vines under which they lurk should be stripped off early in the spring, and the roots examined in October, where they exhibit any unhealthy symptoms from the attacks of the maggots of *C. sulcatus* as soon as the beetles appear ; sieves should be held at night under the branches and leaves, when, by shaking them, the beetles will readily fall into the sieves, but as they drop down when approached, this operation must be proceeded with gently and quietly ; multitudes may be thus collected, both in and out of doors, and if the person who carries the light has a pail or jug of water, the sieves may be emptied into them as occasion may require ; but when the beetles are eventually destroyed, boiling, not warm water, must be used, as the hardness of their horny covering will resist a considerable degree of heat. When the larvæ are ascertained to reside at the base of a wall, salt might be

sprinkled, which will kill them as readily as it will the maggots in nuts; strong infusions of tobacco-water, aloes, and quassia, are also recommended. Where the blood of animals can be obtained, it might be beneficially applied, as it would coagulate over the tender larvæ and pupæ, and set them fast in the earth. (*Gard. Chron.* 1841, 292.)

In North America the peach constitutes an important part of the general produce, serving both as food for swine, and furnishing by distillation a useful spirit. The ravages committed upon them there by insects are so serious, that premiums have been offered for extirpating them. A species of weevil, perhaps a *Rynchites*, enters the fruit when unripe, probably laying its egg within the stone, and so destroys them. And two kinds of *Zygæna*, by attacking the roots, do a still greater injury to the trees. A *Coccus*, as it should seem from the description, imported about thirty years ago from the Mauritius, or else with the Constantia vine from the Cape of Good Hope, has destroyed nearly nine-tenths of the peach trees in the island of St. Helena, where formerly they were so abundant that, as in North America, the swine were fed with them. Various means have been employed to destroy this plague, but hitherto without success. (*Kirby and Spence*, i. 202.)

Wasps are great ravagers of the fruit of the peach

if from any cause an opening is made through its outer skin. The best prevention is to suspend bottles containing a little beer and sugar near the trees, to lure them from the fruit.

THE
GARDENER'S
MONTHLY VOLUME.

THE APPLE;
ITS CULTURE, USES, AND HISTORY.

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THE APPLE.

HISTORY.

If popular language and the earliest products of the pictorial art were admissible authorities, the apple would be the earliest fruit of which we have any record, for they represent it as the cause of our first parents' fall. There is no foundation for such tradition, however; and as the Garden of Eden was probably in some hot latitude, "the fruit of the tree which was in the midst of the garden" reasonably may be concluded to have been some species not native of our European climate. It is quite true that, in our translation of the old Testament, both Solomon and the prophet Joel are represented as alluding to the apple-tree and its fruit, but it is more than doubtful whether that translation is correct. Dr. Parkhurst and other distinguished Hebraists consider that the *tappuach* of the Jewish Scriptures is the citron, and not the apple; and the terse epithets the sacred writers give to it are certainly most applicable to the former. It was a common object of cultivation, "a tree of the field" (*Joel* i. 12), which,

in Palestine, the citron is, but the apple is not. It is a noble tree, lofty and evergreen, such as the poet might justly take as an emblem of a bridegroom. (*Canticles* ii. 3.) But not so the apple-tree, which is there of ill-growth and unproductive, or, to use the language of Dr. Russell, an eye-witness, it is "very bad." (*Natural History of Aleppo*, 21.) Moreover, the fruit of the citron is juicy, refreshing, and fragrant (*Cant.* ii. 5, vii. 8), and of a golden colour, as described in *Proverbs* xxv. 11. Then, again, the frequency of the citron, and its habit of growth and dense evergreen foliage, render it a more fitting shelter than that afforded by the apple-tree. (*Cant.* viii. 5.)

The mention made of the apple in the holy writings being so apparently erroneous, we are justified in considering that Homer affords us the first certain notice of the apple; but he merely mentions it as a tenant, together with other fruit-trees, of the Garden of Alcinous.

Descending to the time of the Romans, we find the apple, and several varieties of it, noticed by their earliest writers on the culture of the soil. Cato, who wrote more than a century and a half before the Christian era, describes three varieties of the apple; one of which, the Quirinian, we may conclude derived its name from its first propagator. It would occupy more space than we can permit were we to even

merely glance over the directions given by Cato, Varro, Columella, and Palladius, for grafting and other portions of its cultivation. Much of their directions is very erroneous, but other parts of it are very correct, and may be adopted with advantage. It is not until we come to the time of Pliny that we find much relative to the biography of the apple, and then we obtain from his "Natural History" many statements that are highly interesting.

"There are many apple-trees," says Pliny, "in the villages near Rome that let for the yearly sum of 2000 sesterses," which is equal to £12 10s. of our money; "and some of them yield more profit to the owner than a small farm." "There are apples," he continues, "that have ennobled the countries from whence they came; and many apples have immortalized their first founders and inventors. Our best apples will honour the first grafters for ever; such as took their names from Martius, Cestius, Manlius, and Claudius." This author particularizes the quince apples, that came from a quince grafted upon an apple-stock, which, he says, smell like the quince, and were called Appiana, after Appius, who was of the Claudian house, and who was the first that practised this grafting. "Some apples," says he, "are so red that they resemble blood, which is caused by their being at first grafted upon a mulberry stock." But of all the apples he mentions, Pliny

- says the one which took its name from Petisius, who reared it in his time, was the most excellent for eating, both on account of its sweetness and agreeable flavour. He mentions nine-and-twenty kinds of apples as being cultivated in Italy at about the commencement of the Christian era.

The practice of propagating the apple from seed is recommended by all the Roman writers we have mentioned, and was continued to be advocated by other Geoponic writers of the western empire in the fragments of their works which have escaped to us. A practice thus advocated to be adopted in the culture of a hardy and favourite fruit readily accounts for the vast number of varieties of the apple that have arisen.

No fruit-tree excels the apple in aptitude to give birth to seedling varieties; and when we find that these have continued to be raised in most parts of Europe for some two thousand years, it is no wonder that the number of recognized varieties amounts to more than 1400. It is certain, however, that the most ancient varieties mentioned in the above quotations long since have been obliterated. Even Pliny notices the decay of apple-trees in his time, and observes that the apple-tree becomes old sooner than any other, and that with old age the fruit becomes less, and is subject to be cankered and worm-eaten even while on the tree. (*Book 16, c. 27.*)

We quite agree with Mr. Knight, Dr. Martyn, and

other vegetable physiologists, in thinking that no kind of apple now cultivated appears to have existed more than two hundred years; and this term does not at all exceed the duration of a healthy tree, or of an orchard when grafted on crab-stocks, and planted in a strong tenacious soil. From the description Parkinson, who wrote in 1629, has given of the apples cultivated in his time, it is evident that those now known by the same names are different, and probably new varieties; and though many of those mentioned by Evelyn, who wrote between thirty and forty years later, still remain, they appear no longer to deserve the attention of the planter. The Moil, and its successful rival the Redstreak, with the Musts and Golden Pippin, are in the last stage of decay, and the Stire and Foxwhelp are hastening rapidly after them. (*Knight on the Apple*, 6.)

Except by some overwhelming convulsion—such as the Deluge—we believe that no species ever becomes extinct, but it is quite otherwise with varieties and hybrids. These, like all other devices of man, have their limited period of existence, beyond which by no ingenuity can it be protracted. Some authorities assert that grafting is a mode of thus protracting vegetable life, but from these we totally differ. It is happily quite true that grafting upon a young and vigorous stock imparts to the scion a supply of sap of which the parent stem is incapable, yet this failure is

only premonitory of the departure of power which will, after a transient increase of strength, occur to its removed member. Every subsequent scion, however frequently, and whilst in apparent health, removed to another youthful stock, will be found to have a period of renewed vigour and productiveness of shorter duration than its predecessor. The Golden Pippin is occasionally quoted as a contrary proof : but this example has no such weight ; for, supposing that this fruit yet exists, still it has not passed the age beyond which the period of unproductiveness and death in the apple-tree may be delayed by grafting ; for we have no mention of this fruit that at all justifies the conclusion, that the Golden Pippin existed much more than three centuries ago. A Pearmain apple is mentioned in records as old as King John (A.D. 1205) ; but the Pippin is not noticed by any authority earlier than the reign of Henry VIII. (1509). Lambard mentions that Tenham, in Kent, famous for its cherry-gardens and apple-orchards, was the place where Richard Harris, or Haines, that king's fruiterer, first planted cherries, Pippins, and the Golden Renate.

Supposing, then, that the Golden Pippin of our days is a genuine portion of the Tenham trees, handed down to us by successive graftings, yet still, though in extreme decrepitude, it has not exceeded the age assigned by naturalists as that beyond which the life

of the apple does not extend. But then another question will arise, supposing our Golden Pippin does not appear to survive the allotted period. Who will undertake to demonstrate that the Golden Pippin of Tenham still exists? It is quite certain that a majority of the apples for which the title of Golden Pippin is claimed have no pretensions to the distinction, and more than one old person with whom it was once a favourite fruit now declare that it is no longer obtainable. Be this as it may, even if the tree in question has not already departed, yet even those who maintain that it is still to be found lingering in our fruit gardens, acknowledge that it is in the last stage of decrepitude and decay: it is following the universal law of nature; no organized creature shall endure through all time. Grafting may postpone the arrival of death, as the transfusion of blood will revive for a while the sinking animal, but the postponement cannot be for a time indefinite: the day must come in both the animal and the scion, when its vessels shall be without the energy to propel or assimilate the vital fluid, though afforded to it from the most youthful and most vigorous source.

The history of the apple in Britain is traceable to the earliest period of which we have any written record. We are even fully warranted in believing that this fruit was known and cultivated by the Britons before the arrival of the Romans upon our shores,

for in the Welch, Cornish, Armorican, and Irish languages and dialects, it is denominated the Avall or Aball. The fruit therefore had a native name, from which our present name apple is evidently corrupted, and the Hoedui, inhabitants of the modern Somersetshire, appear especially to have cultivated this fruit. Their chief town even derived its name from the circumstance of its being surrounded by plantations of the apple, for it was known as Avallonia (Apple Orchard) when first visited by the Romans. Glastonbury stands upon its ancient site. (*Richard's Chron.* 19.) The cultivation of the apple was not confined to our south-western districts, for another town named after it, Avallana, was in the north of England, and in the course of the third century we have decisive testimony that the Roman settlers had introduced fresh varieties of this fruit, and that its cultivation had become so extended that large apple orchards had been made as far north as the Shetland Islands. (*Solinus*, cap. xxii.) Traces of ancient orchards are still existing in those high northern localities, and one in the Hebrides, belonging to the Monastery of St. Columb, is described by Dr. Walker as having existed there, probably, from the 6th century. (*Essays*, ii. 5.) Others are mentioned by Camden and Leland. It is quite certain that in the middle ages the apple had become one of our staple vegetable products, for whenever the chroniclers speak of times

of dearth, apples are almost always mentioned as articles causing distress by their scarcity ; and in the Remembrance Office a M.S. exists in Henry the 7th's (1485—1509) own handwriting, in which he records that on one occasion apples were from one to two shillings each, a red one fetching the highest price.

We have now arrived at the era when our agricultural and horticultural literature commences, and we find that Fitzherbert, in his "Book of Husbandry," published in 1598, has many, and, in most instances, good directions for the culture of the apple. They are, unlike the works of his contemporaries and immediate successors, the evident result of experience, and not mere translations from the classic Geoponic writers. Thus, on grafting the apple, he says, "Graft that which is got of an old apple-tree first, for that will bud before the graft got on a young apple-tree late grafted in. For all manner of apples a crab-tree stock is good, but the apple-tree stock is much better."

The varieties of the apple had now largely increased, for Dodoens, writing in 1583, says they were so numerous "that it is not possible, neither necessary, to number all the kinds."

Gerard, writing of this fruit in his "Herball," during 1597, also speaks of the infinite varieties of the apple, but seems to attribute the variation much "to the soil and climate." "Kent," he goes on to

say, "doth abound in apples of most sorts. But I have seen in the pastures and hedge-rows about the grounds of a worshipful gentleman dwelling two miles from Hereford, called Mr. Roger Bodnome, so many trees of all sorts, that the servants for the most part drink no other drink but that which is made of the apples. The quantity is such that the parson hath for tithe many hogsheads of syder. The hogs are fed with the fallings, which are so many that they will not taste of any but the best." Though the varieties were so numerous, Gerard gives drawings of but six, which we may presume were the most in favour, and were the Pome-water, Baker's-ditch, King Apple, Queening or Queen Apple, Summer Pearmain, and Winter Pearmain. Heresbach, who wrote a little earlier (1570), says the "cheefe in price" were the Pippin, the Romet, the Pome-royal, and the Marli-gold.

Sir T. Haumer, writing about the year 1660, says the principle apples were "Summer Pepin, Holland Pepin, Russet Pepin, Kentish Pepin, the best supposed in England, Russeting, Gilliflower, Muscadine Queen, John Apple, King Apple, Golden Reinette, the Royal, Hollow-crowned, and Common Pearmain, Old Wife, Nonesuch, Figg Apple; all these are sold at 8d. the tree, except the Figg Apple, which is 5s." (*Gard. Chron.* 1843, 841.)

We have already noticed the Golden Pippin and its

probable age, and we mention it again to observe that it is said to be a native of Sussex, and to have been first reared at Barham Park, situated on the north side of the South Downs. The Dutch acknowledged it to be an English apple in their catalogue of fruits, where it is called the "Engelsche goud Pepping." The French call it "Pippin d'Or," which is a translation of the English name. Worlidge notices the Golden Pippin, and says, "it is smaller than the Orange-apple, else much like it in colour, taste, and long-keeping." Evelyn observes, in his Diary, 22nd October, 1685, that "at Lord Clarendon's seat at Swallowfield, Berks, there is an orchard of 1000 Golden and other cider Pippins." Catherine, Empress of Russia, was so fond of this apple, that she was regularly supplied with it from England; and in order that she might have it in the greatest perfection, each apple was separately enveloped in silver paper before it was packed. (*Phillips' History of Fruits*, 34.)

We have already noticed the early existence of apple orchards in the south-west of England, and we must not close this section without some further remarks upon that great cider district. Evelyn says that Herefordshire alone, in his time, was known to produce annually 50,000 hogsheads of cider, and, proceeding to remark on some of the apples employed in its manufacture, states that the Redstreak was a

pure wilding, and within the memory of some then (1676) living was named the Scudamore's Crab, and not much known save in the neighbourhood. It is to the perseverance of Lord Scudamore, thus commemorated, that the orchards in that district are indebted for some of their best varieties. He was our ambassador to the court of France during the reign of Charles I., and he lost no opportunity of collecting scions of the best apples he heard of on the continent, and transmitting them to his west-country estates.

Since then, Mr. Knight and many others have laboured most assiduously for the improvement of our cider fruits, but with comparatively little benefit. It is in vain that efforts are made to improve the varieties of our apples if the orchardist does not take commensurate pains to cultivate them carefully. We fear that that, too generally, is not the case, but that the following sketch of west-country orcharding is far too near to accuracy. It is from the pen of one of the best practical gardeners of the day, and we hope the satire may induce amendment rather than indignation at the exposure.

“The trees are planted, to a large extent, apparently without considering what sort of soil or situation is best, and without making any previous preparation; a situation is chosen, a pit is dug with a curious clumsy bit of iron, having a large socket-hole at one end of it, in which is driven a large strong pole, which

answers for a handle ; it is worked with both hands over one knee ; the depth that the roots are buried does not seem to be of any moment, provided the trees are firmly fixed, so as to prevent the wind from driving them down. I have never observed any pruning performed, except such as is done by bullocks, horses, donkeys, &c. ; and as I have not observed any "horse-ladders" here in use, of course the pruning is not very effectively performed about the top part of the very lofty trees. The only digging or stirring the surface of the ground among the trees that I have observed is done by pigs, which are occasionally allowed to rove in some orchards at certain seasons of the year, with the rings taken from their snouts. In a moist season these intelligent animals occasionally turn up the ground in a tolerably regularly manner ; and where this is the case the good effects of their industry are obvious. However, it is only on rare occasions that they are allowed to perform this surface operation. The animals that do the pruning are the principal business-performing creatures, as, in addition to that operation, they tread down the under crop of grass, weeds, and other rubbish, take the fruit to the cider-mill, and the cider to the consumer ; besides, on rare occurrences, a little manure is conveyed by them, and placed over the roots, close to the trunks of the trees ; it is sometimes, although rarely, placed at the great distance of three or four feet from

the trunk. Bipeds, notwithstanding, perform some of the most interesting and essential parts, such as planting, collecting the fruit, consuming it in part, and assisting in making the cider ; together with shooting at the trees annually on Old Twelfth-night. Let it rain, hail, blow, or snow, this very essential and interesting ceremony is always commenced at 12 o'clock at night, a tremendous fire being kept up for several hours afterwards. They repeat or sing the following interesting song, with all the might which their lungs will permit. The juice of the fruit is generally made use of for many hours, pretty freely, previously to this interesting ceremony, so that a perfect ripeness of address and expertness in gunnery is the result. Guns and firelocks long laid by are on this remarkable occasion brought forward. The following is what I have heard sung on these occasions, although much more is added in some localities :—

“ Here’s to thee, old apple-tree,
 Whence thou mayest bud, and whence thou mayest blow ;
 And whence thou mayest bear apples enow ;
 Hats full, caps full !
 Bushel, bushel-sacks full !
 And my pockets full too !
 If thee does not bear either apples or corn,
 We’ll down with thy top, and up with thy horn.”

(Here the natives shoot at the tree.)

Not being acquainted with the custom here on the

first Old Twelfth-night, I must acknowledge that I was somewhat alarmed at such a continual loud and rattling report of fire-arms in every direction, living as I did in a rather retired spot, away from any other residence. It was a cold, gloomy, dark, and still night, and being suddenly awake by the loud reports of fire-arms, I could not guess the meaning of it at that untimely hour. I imagined at first that it was an affray with gamekeepers and poachers, or with smugglers and blockade-men; and, suddenly hearing a shrill vacant kind of hallo in a plantation close by, I fancied at first that it was some poor fellow who had been wounded in the affray: on getting up, however, I found that it was a couple of owls answering each other; they were as happy as could be, and the firing, I soon found, was in no particular spot, but went pop, bang, east and west, north and south. On making an early inquiry next morning, I was informed that it was the yearly custom. The apple-trees, with few exceptions, are entirely left to nature, consequently they are entirely covered from top to bottom with long moss and lichens; the wood and branches are as thick as those of a weeping-willow; the fruit is generally very small and corey. The varieties are not numerous: they seem all in this locality to cultivate the same kinds. I have sometimes thought other good sorts could be beneficially cultivated—some of the large, free-bearing, juicy varieties, such as the

Hawthornden, Keswich Codling, Kentish Beauty, Kentish Fill-basket, &c. When I make mention of those sorts, and a number of others, I am always informed that they will not answer hereabouts, although I have never met with one person that has ever attempted, or that had ever heard of any one else attempting to introduce them! I should be rather inclined to think that those large juicy kinds, cultivated for mixing with the little Bitter-sweets, would not be amiss, although I dare say, under the present system of cultivation, they would not be produced very large or juicy. The leaves of the trees show great poverty; they are small, thin, and are not much larger than damson leaves; they turn yellow, and fall off in some localities long before the fruit has arrived at perfection; and the abundance of long moss and lichen, in my opinion, to a certain extent indicates poverty.

“I will here attempt to describe three different orchards, under the management of three different persons. The first is an orchard of above 12 acres in size; the owner never digs, manures, or prunes himself, but leaves those operations to be performed by his cattle; he does not allow pigs to run in his orchard, therefore he has no digging done; and the consequence is, that he does not get a tree to bear fruit once in seven years. He lately informed me that he should not have apples enough this autumn to make four hogsheads of cider; that the seasons were

now so unfavourable he could get no apples, and were it not for the grazing for his cattle underneath the trees, he should have no return, which was now become a very poor one. I asked him why he did not manure the trees. In reply, he observed, that they have all that the cattle make among them ; he did not mow, or carry anything away from them. The second is a small orchard about one acre in extent, the owner of which manures about his trees every season ; here, however, there is no digging done. The trees are healthy, they grow and make wood, and produce large thick and dark-green leaves and strong buds ; they are not so thickly covered with moss and lichen, and rarely fail to bring forth a heavy crop of good fruit. This person's cider is much sought after, being good, and of course of more value. He makes a larger quantity of cider than the person mentioned above with his 12 acres. The last is a small orchard held by another individual, who keeps no other cattle besides pigs, which are allowed to rove at freedom about the orchard, and as the rings are taken out of their snouts in autumn, when the ground is nicely softened by the rains, and the worms are working near the surface, those worthy animals rout and turn up the surface in a tolerably regular way. From the digging and manuring by the pigs, and from what the holder can muster, this is the best bearing, healthy, orchard in the district. It produces the best cider and the least

moss and lichen. This shews how beneficial a little surface-stirring, with the addition of a little manure, is. A considerable quantity of cider made and consumed hereabouts is very poor; the visages of the men who are in the constant habit of drinking it are sallow and wrinkled." (*Gard. Chron.* 1844, 636.)

The criticism, of course, falls harmless upon some orchardists, whose practice offers a striking contrast to that of their more ignorant and careless neighbours; and to these we would add this warning, that, beyond all doubt, their ill-cultivation occasions the early decrepitude of good varieties, and the frequent occurrence of failing crops, far more than any ungenial vicissitudes of our climate, or any other natural causes.

BOTANICAL CHARACTERS.

PYRUS MALUS, the apple, belongs to the Icosandria Pentagynia class and order of Linnæus, and to the Rosaceæ of the natural system. The generic characters are, *Petals* flat and spreading; *Styles* five, somewhat united at the base; *Pome* usually globose and depressed, always umbilicate at the base; *Footstalks* simple, umbellate; *Leaves* simple, glandless.

The specific characters are, *Leaves* ovate or elliptic, acute, serrated, clothed beneath with white down, as well as on the calyxes, petioles, and footstalks; *Flowers* corymbose; *Styles* glabrous.

It is found wild in every part of the British isles and in most parts of Europe. In its cultivated forms, the leaves become larger, more downy, and thicker; the tree larger and more robust; and the fruit finer both in size, flavour, and beauty.

The first fruitful age of the wild apple or crab is usually from eight to ten years, but the periods which seedling apple-trees require to attain sufficient maturity to produce fruit appear to admit of much more variation. Some do not produce blossoms till they are sixteen years old; others have blossomed in the ninth and tenth year; and a few have been known to produce fruit at only five years old. These are very extraordinary instances of early maturity; Mr. Knight having two only thus precocious in more than twenty thousand seedling trees that came under his observation. (*Knight on the Apple*, 14.)

The apple-tree has many things in common with the pear-tree, but the leaf is more shortly mucronate, less manifestly serrate, and subhirsute underneath. The flowers tinged with red, and smelling very sweet. The peduncle shorter. The stamens usually from 19 to 25 (in the pear 22: Pollich assigns 19 as the limit in the apple, 21 in the pear). The fruit round, hollowed at the peduncle, depressed at top, less astringent but more acid than the pear, and of a softer texture. The apple has wood threads passing through it from the peduncle, ten of which are regularly dis-

posed round the capsules, and tend to the calyx. It is said that the fruit rots when these are broken. The pear also has them, but they are not so distinct on account of the calculary or stony congeries. In the apple they are placed very regularly, one at the point of each cell of the capsule, and one in the middle between the other five. They are very apparent on a transverse section of the fruit. The cells are differently shaped in the two fruits: in the apple they are narrow and pointed at both ends; in the pear they are obvate, broad exteriorly, and drawing to a point at the end next the centre of the fruit. The pear, however it may vary in shape, size, colour, taste, &c., by cultivation, is generally convex and lengthened out at the base; whereas in the apple it is always concave there. Besides this, the leaves of the apple are commonly wider in proportion to their length, of a yellower green above, and whitish underneath; whereas in the pear they are dark green above, and quite smooth on both sides: their vascular system is very different, being very loose in the apple, and very close in the pear; hence the leaves of the latter are much stouter and more permanent. Lastly, the growth of these trees is quite different; the pear being lofty and upright, the apple low and spreading. (*Martyn's Miller's Dict.*)

CHEMICAL COMPOSITION.

M. PAYENSTECHEER observes that the fruit of neither pears nor apples assume a blue colour when treated with iodine, shewing that they do not contain starch. It is obvious, from the black colour struck when they are cut with a knife, that they contain also tannin, or gallic acid, or both. They contain likewise pectic acid and malate of potash. The fermented juice of apples is called cider. It is specifically heavier than water, assumes a brown colour when concentrated by evaporation, and deposits a blackish-brown powder, and leaves a thick brown syrup. Cider contains alcohol, incrySTALLIZABLE sugar, gum, extractive, malic acid, bimalate of potash, malate of lime, a trace of phosphate of lime, and of sulphates and muriates. (*Thomson's Vegetable Chem.* 892.)

Mr. Solly has made some slight examinations of several varieties of the apple, the results of which appear in the following table. The column exhibiting the quantity of organic matter in each may be considered, probably, as a true statement of their relative nutritive qualities. In which case the Golden Harvey is the most nutritious, and the Court of Wick the least so.

	Water.	Organic matter.	Inorganic matter.	Inorganic matter in dry plant.
Apple blossoms	8424	1478	98	627
— Dutch Mignonne, small unripe	8972	978	50	487
— Do. ripe	8559	1420	21	151
— Court of Wick, small unripe	8839	1114	47	411
— Do. ripe	8525	1438	37	252
— Nonpareil .. ripe	8012	1961	27	140
— Ribston Pippin .. ripe	7905	2051	44	214
— Golden Pippin, seedling	8024	1929	47	241
— Wellington .. ripe	8376	1595	29	184
— Blenheim Pippin ripe	8486	1491	23	157
— Golden Harvey .. ripe	7825	2140	35	162
— Golden Reinette ripe	8399	1578	23	146
— Canada Reinette ripe	8489	1481	30	198

(*Trans. Hort. Soc.* iii. 62, N.S.)

The ashes of the wood of the apple-tree have been analysed by MM. Fresenius and Will, and they found them to be thus constituted :—

Potash	13.67
Soda	0.32
Chloride of sodium (common salt) .	0.32
Lime	45.19
Magnesia	5.30
Phosphate of iron	1.71
Silica	0.93
Sulphuric acid	0.66
Phosphoric acid	2.95
Carbonic acid	24.18
Carbon and sand	2.03
Loss	2.74
	<hr/>
	100.00

The acids were, of course, combined with the potash, soda, lime, and magnesia, in the form of sulphates, phosphates, and carbonates.

VARIETIES.*

Aagtje Rouje Nova.—Red, conical, very large, kitchen; November to January.

Achmore.—Green and red, conical, middle-sized, table, second-rate; December and January.

Adam, D' (Seigeneur rouge).—Red, ribs very prominent, middle-sized, cider; November to January.

Admiral Duncan, Newbold's, see Rymer.

Adam's Apple.—Darkish red, oblong, middle-sized, indifferent; December to January.

Avent, D.

Agat Rouge.—Streaked, ovate, small, indifferent or bad; December; of no value.

Agathe Grise.—Palish yellow, ovate and oblong, middle-sized, indifferent; December.

Alban.—Greenish red, round, middle-sized, cider; December.

Alcester Seedling.

Alderston Pippin.—Palish yellow, ovate, small, table, second-rate; August.

Alexander (Emperor Alexander, Russian Emperor, Aporta).—Streaked, conical, large, kitchen, first-rate, September to December; moderate bearer, large and handsome. A Russian apple.

Alfriston (Newtown Pippin of many, Lord Gwydyr's Newtown Pippin, Baltimore of some, Oldaker's New).—Greenish yellow, roundish, large, first-rate; November to April; a valuable kitchen apple.

* Authorities—*Catalogue of Fruits in Hort. Soc. Garden*; *Lindley's Guide to the Orchard, &c.*

Althorp Pippin, see Marmalade.

American Mammoth, see Gloria Mundi.

American Peach.—Reddish yellow, roundish, middle-sized, second-rate ; September.

American Peach, see Pigeonnet.

American Pippin.—Greenish red, round, middle-sized, kitchen ; January to July ; one of many having this vague name.

American Plate, see Golden Pippin.

Amerique D', see Noir.

Ange, D'.—Green, roundish, small, cider ; October.

Angleterre, D', Grosse, see Reinette Wahre.

Anglaise, see Reinette Jaune Sucree.

Anis, D', see Fenouillet Gris.

Anis-seed (Rival Golden Pippin).—Greenish yellow, oblate, small, table, second-rate ; October to January.

Annette Black.—Darkish red, ovate, middle-sized, kitchen and table, second-rate ; November to January.

Api Gros.—Oblate, middle-sized, kitchen, second-rate ; December to January.

Api Noir.—Darkish red, oblate, small, indifferent ; October to April.

Api Panache (Panachee).—Yellowish green, roundish, small, indifferent ; October to December ; more curious than useful.

Api Petit (Pomme Rose, Lady Apple of the Americans, Etoilee).—Yellowish red, oblate, small, table, second-rate ; October to April ; fruit very beautiful, but the tree is exceedingly subject to canker.

Aporta, see Alexander.

Arabian Apple, see Pigeon.

Arley, see Wyken Pippin.

Argentee D'Angleterre.

Aromatic Pippin.

Aromatic Pippin, Edmonston's, see Kerry Pippin.

Ashby Seedling.—Yellowish red, roundish, middle-sized, table, second-rate ; December to January.

Ashmead's Kernel.—Yellow, oblate, middle-sized, table, first-rate; November to May. Raised by Dr. Ashmead, of Ashmeads, Gloucestershire.

Ashstead Park.

Astems, D' (Streifling d'Hiver).—Green-streaked, roundish, middle-sized, kitchen, second-rate; November to March.

Astrachan Red.—Red, conical, middle-sized, table, second-rate; August to September. Introduced from Sweden in 1816.

Astrachan White (*Pyrus Astracana*, Pomme d'Astrachan, Transparent de Moscovie, Glace de Zelande).—Palish yellow, conical, middle-sized, table, first-rate; August to September; good bearer. Introduced from Russia; said to grow wild near Astrachan.

Assy, D', Grosse.

Augusæble.

Aunt's Apple.—Streaked, roundish, large, kitchen, second-rate; November to March.

Aurore, see Golden Reinette.

Autumn Bough, see Large Yellow Bough.

Avant Tout, see Summer Stibbert.

Baines's.—Streaked, oblate, middle-sized, kitchen and table, second-rate; November to March; Ribston Pippin flavour, but not so rich.

Baird's Favourite.

Balderston Seedling.—Streaked, conical, second-rate; October to November.

Baldwin (Red Baldwin, Butter's, Woodpecker).—Greenish red, roundish oblong, large, kitchen, first-rate; November to April.

De Bale.

Baleborodova.—Palish yellow, ovate, large, indifferent; August; of no merit in this climate.

Balgone Pippin, see Golden Pippin.

Balgowan.

Balmanno Pippin.—Greenish brown, roundish, ovate, large, table, second-rate ; October to December.

Baltimore.—Large, flat, brown-coloured and russet, middle quality. Raised by a Mr. Smith, at Baltimore.

Baltimore (of some), see *Alfriston* and *Gloria Mundi*.

Bamporta. *Barbarin, De*.

Bardin, see *Fenouillet Rouge*.

Barossa, see *Bourassa*.

Barrow Court Pippin.

Barton's Favourite.

Bascombe Mystery.

Basselanery Pippin.

Bath.—Yellow, roundish, large, kitchen, second-rate ; November to December.

Bay, see *Drap d'Or*.

Bayfordbury Pippin, see *Golden Pippin*.

Beachamwell (*Beachamwell Seedling*, *Motteux's Seeding*).—Yellow, ovate, small, table, first-rate ; December to March ; an excellent table fruit. Raised by J. Motteux, Esq., of Beachamwell, Norfolk.

Bean.

Beat's Pippin.—Streaked, roundish, large, table ; November to January.

Beaufin Millmount, see *Norfolk Paradise*.

Beaufin, Norfolk (*Cat's-head* of some, *Cat's-head Beaufin*, *Read's Baker*).—Darkish red, oblate, middle-sized, kitchen, first-rate ; January to June ; excellent for drying.

Beaufin, Suffolk.

Beaufin, White.

Beaufinette.—Red, oblate, large, kitchen ; November to February.

Beauty of Kent (*Kentish Pippin* of some).—Streaked, roundish, large, kitchen, first-rate ; October to February.

Beauty of Newark, Smith's.—Yellowish red, ovate, middle-sized, table ; September to October.

Le Beau Rouge, see Hollandbury.

Beauty of the West.

Beauty of Wilts.—Palish green, oblate, middle-sized ; November to December.

Beauty of Wilts, Dredge's, see Harvey's Pippin.

Beauty of the World.

Bec de Lievre.—Yellow, ovate, middle-sized, indifferent ; October to November.

Bedfordshire Foundling (Cambridge Pippin).—Yellow, roundish, oblong, large, kitchen, first-rate ; November to March ; very handsome, large and excellent.

Belin, Pomme de, see Court Pendu Musque.

Belle Bonne.—Streaked, conical, middle-sized, kitchen, first-rate ; November to April.

Bel Ecossais.

Belle Fille, see Reinette Grise.

Belle Fleur.—Yellowish red, roundish, small, indifferent ; November to December.

Belle Fleur, Brabant.—Yellowish red, roundish, large, kitchen, first-rate ; November to April.

Belle Fleur, Double.—Palish yellow, ovate, middle-sized, second-rate ; December.

Belle Fleur, Egben.—Russet, ovate, small, second-rate ; November to March.

Belle Fleur, Hollandische.—Green and yellowish red, oval, middle-sized, indifferent ; December.

Belle Fleur, Westlandische.—Streaked, ovate, small, second-rate ; December.

Belle Fleur de Stoffels.—Streaked, ovate, small, second-rate ; November to December.

Belle Fleur Rouge.—Red, ovate, small, indifferent ; December.

Belle Fleur Yellow (*Belle Fleur, Belle Flower*).—Yellow, oblong, large, kitchen, second-rate ; November to March.

Belle Fleur, Zoete.—Reddish yellow, oblong, middle-sized, second-rate; December to January.

Belle Herry (De Jardy).—Green, roundish, large, kitchen, second-rate; November to March.

Belle de Senard.

Bell's Scarlet, see *Scarlet Pearmain*.

Belledge Pippin.—Yellow, ovate, middle-sized, table, second-rate; November to March.

Benholm Pippin.

Ben Lomond.—Greenish yellow, oblong, large, kitchen; October to December.

Bennet.—Greenish red, ovate, middle-sized, cider; November to December; a bitter-sweet.

Benoni.

Bentleber Rose.—Red, calville-shaped, middle-sized, kitchen, indifferent; October to December.

Benwell's Large.—Green, roundish, large, indifferent; December.

Benzler.—Streaked, ovate, middle-sized, cider; December to May.

Bere Court Pippin.—Greenish red, ovate, middle-sized, kitchen; September to October. Raised by Dr. Brendon, at Bere Court, Berks.

Bess Pool (Best Pool).—Greenish red, oblate, middle sized, kitchen, second-rate; December to April.

Betsey.—Yellowish russet, oblate, conical, middle-sized, table, first-rate; November to February; tender juicy flesh.

Beverly Red.

Beurre a Cidre.—Yellow, ovate, small, cider; December.

Binet, De.—Cider.

Birmingham Pippin (*Brummage Pippin*, *Grummage Pippin*).—Yellow russet, round, table, first-rate; January to June. A Warwickshire apple.

Birnformiger.—Yellowish red, pear-shaped, middle-sized, table, second-rate; November to February.

Bishopstone Norman.—Green and yellowish red, round, ovate, middle-sized, cider.

Bitter Sweet.—Cider.

Bitter Sweet, Siberian.—Yellow, ovate, small, cider, first-rate; September; great bearer and excellent for cider.

Bitter Sweet, White.

Black.

Black American.—Darkish red, roundish, middle-sized, table, second-rate; November to December.

Black Bess.

Black Crab (Black Borsdorffer).—Darkish red, roundish, small, indifferent; November to January; curious on account of its colour, in other respects worthless.

Black Grove.—Greenish red, pear-shaped, middle-sized, indifferent.

Black Pippin.

De Blanc.

Blanc Feuille.

Blandarine, Red.

Bland Rose.—Yellowish red, roundish, middle-sized, table, second-rate.

De Blangy.—Yellow, ovate, small, cider; October.

Blenheim Crab.

Blenheim Pippin (Blenheim, Blenheim Orange, Woodstock Pippin, Northwick Pippin).—Yellow, roundish, large, kitchen and table, first-rate; November to February. Raised by a baker at Old Woodstock.

Blinkbonny Seedling.

Blood Royal.—Darkish red, roundish, large, kitchen, second-rate; September to November.

Blumensaur.

Boatswain's Pippin, see Queen Charlotte.

De Bœuf.—Green, oblate, middle-sized, kitchen; December to January.

Bogmiln Favourite.—Streaked, round, small, table, second-rate; November to January.

Bois Panache, a.—Yellowish green, oblong, middle-sized, kitchen; October to November.

Bollaston Hill.

Bonne de Mai, see *Drap d'Or*.

Bonne Rouge, see *Hollandbury*.

Bonvier.—Streaked, conical, middle-sized, table, second-rate; December.

Borsdorffer (Edler Winter Borsdorffer, Le Grand Bohemian Borsdorffer, Borstorffer, Reinette Batarde, Reinette Borsdorffer, Bursdoff, Winter Borsdorffer, Reinette de Misnie, King, King George, Queen's, Garret Pippin).—Yellowish red, oval, small, table, first-rate; November to March. A German apple, a great favorite with Queen Charlotte, who imported it in 1761.

Borsdorffer, Black, see *Black Crab*.

Borsdorffer, Double.

Borsdorffer Ognoniforme.—Greenish red, oblate, small, table, indifferent; October to January.

Borsdorffer, Rother.

Borovitsky.—Green-streaked, roundish, middle-sized, first-rate; August. A Russian apple, raised in the Taurida Gardens, near St. Petersburg, early this century.

Bossom.—Yellow, conical, large, kitchen, second-rate; December to January.

Bostock Orange.

Bough, Large Yellow (Autumn Bough).—Yellow, roundish, large, kitchen, first-rate; August.

Bough Red.

Boxford.

Brainge.—Streaked, ovate, small, cider; November.

Brainton, Symonds's.—Yellow, roundish, middle-sized, cider.

Bransby Pippin.

Brazier's.

Bourassa (Barossa).—Russet red, conical, middle-sized, kitchen and table, second-rate; October to December.

Bower.

Brandy, see Golden Harvey.

Braune Mal.—Brown, oblate, large, kitchen ; December to March.

Braunschweiger Milch.—Pale yellowish red, roundish, middle-sized, table, second-rate ; August.

Brebis.—Yellow, roundish, small, table, cider, second-rate ; August.

Breedon Pippin.—Yellow, oblate, small, table, first-rate ; October to November. Raised by Dr. Breedon, of Bere Court, Berks.

Brentford Crab, see Isleworth Crab.

Bretagne, De, see Reinette du Canada.

Brickley Seedling.—Greenish red, roundish, small, table, first-rate ; January to April.

Bridgewater Pippin.—Yellow russet, calville-shaped, large, kitchen, second-rate ; October to December.

Bringewood Pippin.—Yellow, oblate, small, table, second-rate ; January to March. Hybrid between Golden Harvey and Golden Pippin, raised by Mr. Knight.

Broad End (Broading, Winter Broading).—Green, oblate, middle-sized, kitchen, first-rate ; November to January. A Norfolk apple.

Broad-Eyed Pippin.—Yellow, oblate, large, kitchen, first rate ; September to December.

Brookes's.—Yellow russet, ovate, small, table, first-rate ; September to January.

Broughton.—Yellowish red, roundish ovate, small, table, first-rate ; October to December.

Brownite.—Streaked, oblate, middle-sized, indifferent ; December to January.

Brown Apple of Burnt Island, see Spice Apple.

Brown Kenting.

Brown Spice, see Spice Apple.

Brummage Pippin, see Birmingham Pippin.

Buck's County (Solebury Cider).—Yellowish red,

conical, large, cider; November to March; great bearer.

Brundable.

Buchannan.—Palish yellow, oblong, middle-sized, kitchen, second-rate; September to November.

Buchannan's Long Keeper.—Yellowish green, round, middle-sized, second-rate; January to April.

Buckland, Devonshire (Lily Buckland, White Lily, Dredge's White Lily).—Palish yellow, oblate, middle-sized, kitchen, first-rate; December to March; good bearer.

Buckland, Yellow.—Yellow, oblate, middle-sized, kitchen, indifferent; December to March.

Buffcoat.—Yellow russet, roundish, cider.

Buissier.—Cider.

Bullock's Pippin, see Sheep's Nose.

Burchan Minna. *Burgin.*

Burns's Seedling.—Yellowish red, roundish, large, kitchen, first-rate; October to January.

Burnt Island Pippin, see Spice Apple

Burr Knot (Burr Apple).—Yellow, roundish, large, kitchen, first-rate; October to January; strikes easily from cuttings. (See *Oslin.*)

Busham.—Yellowish green, roundish, middle-sized, kitchen, second-rate; December to March.

Byre End.—Palish yellow, roundish, large, kitchen, second-rate; December.

Byson Wood (Byson Wood Russet).—Russet, roundish, small, table, first-rate; December to February.

Caldwell, see Rymer.

Cadbury.—Yellow, conical, small, cider.

Calabria Pippin. *Calander.*

Calville, Autumn.

Calville Blanche d'Ete (White Calville).—Palish yellow, calville shaped, middle-sized, kitchen, second-rate; August to September.

Calville Blanche d' Hiver (Rambour a Cotes Gros of some).—Palish yellow, calville-shaped, large, kitchen and table, first-rate ; January to April.

Calville d' Angleterre, see Winter Queening.

Calville Bosc.

Calville Imperiale.

Calville Kops.

Calville, Large White.

Calville Malingre.—Red, calville-shaped, large, kitchen, first-rate ; January to April ; great bearer, and keeps well.

Calville Normande (Malingre d' Angleterre).—Red, calville-shaped, large, kitchen, second-rate ; January to March.

Calville Pippin.

Calville Red (of some), see Pomme Violette.

Calville Rouge d' Anjou d' Hiver.

Calville Rouge d' Automne.—Red, calville-shaped, large, kitchen, indifferent ; October to November.

Calville Rouge d' Ete (Calville d' Ete, Madeleine).—Red, calville-shaped, middle-sized, kitchen, second-rate ; July to August.

Calville Rouge d' Hiver (Calville Rouge Couronnee, Red Calville).—Red, calville-shaped, middle-sized, kitchen, indifferent ; November to December.

Calville Rouge de Micond.—Red, oblate, small, kitchen and table, second-rate ; July to November ; bears occasionally two crops a year. Originally from the Baroness Micond, raised at La Charite sur Loire.

Calville Rouge de Pentecote.—Red, calville-shaped, large, kitchen, second-rate ; January to April.

Calville Rouge Precoce.—Red, calville-shaped, small, kitchen, indifferent ; August.

Calville Royale.

Calville, White, see Calville Blanche d' Ete.

Cambridge Pippin, see Bedfordshire Foundling.

Cambusnethan Pippin (Winter Red Streak, Watch

Apple).—Yellowish red, oblate, middle-sized, table, first-rate ; October to January.

Cambridge Hive.

Cam House.

Campagne Doux.—Russet, roundish, small, table, second quality ; October to January.

Campfeld.—Yellowish red, oblate, middle-sized, cider ; December to January.

Canadian Pippin. *Canu.*

Carel's Seedling, see Pinner Seedling.

Carle, Pomme, see Male Carle.

Capucine de Tournay.—Yellowish red, calville-shaped, middle-sized, kitchen, second-rate ; December.

Carberry Pippin.

Cardinal Rouge.—Red, roundish, middle-sized, table, second-rate ; November to January.

Carnation.

Carolina Pippin.

Caroline.—Streaked, roundish, large, kitchen, first-rate ; November to February. Named after Caroline Lady Suffield, of Blickling Hall, Norfolk.

Carthouse, see Gilpin.

Carree.—Pale yellow, oblong, small, kitchen, indifferent ; November to January.

Carree Blanche.—Pale yellow, roundish, large, kitchen, second-rate ; November.

Carse of Gowrie, Early.

Carse of Gowrie, Late, see Tower of Glammis.

Catline (Gregson, Catline of Maryland).—Yellowish red, oblate, small, table, second-rate ; October to December.

Catshead (Costard, Coustard).—Pale green, oblong, large, kitchen, second-rate ; October to January. This was a prevailing apple in the 16th century, so that dealers in apples were called *costard-mongers*, now *coster-monger*.

Catshead, see *Norfold Beaufin*.

Catshead, Round (*Tete du Chat*, of Jersey).—Yellow, roundish, large, kitchen, first-rate ; December to March.

Cellini.—Greenish red ; oblate, middle-sized, kitchen ; October to November. Resembles the *None-such*.

Chalcomb.

Chalmers's Large, see *Dutch Codlin*.

Chamœleon.

Chance, see *Reinette Jaune Sucree*.

Chapple.

Charlamowskischer Nallivia.—Yellow, oblate, middle-sized, table, second-rate ; October. A Persian apple, indifferent in this climate.

Charlemagne.—Red, roundish, small, indifferent ; October.

De Charles, Pomme, see *Male Carle*.

De Charlotte.—Green, oblate, middle-sized, cider.

Chataignier.—Streaked, ovate, middle-sized, kitchen ; two years ; contains a very strong acid.

Chataignier du Leman.

Chaudiere.—Green, roundish, small, cider.

Chauffard.—Streaked, ovate, large ; August to September.

Chelston Pippin.

Cheese, Summer.

Cheese, Winter.

Chemise de Soie Blanche.—Pale yellow, roundish, middle-sized, kitchen, second-rate ; January to April.

Christie's Pippin.—Yellow, oblate, small, table, first-rate ; December to February. Subject to canker.

Chuchet Egg.—Yellow, ovate, small, table, second-rate ; September.

Churchill's Seedling.

Cierge d'Hiver.—Green, conical, small, cider ; November to December.

Citron, see Reinette Jaune Sucree.

Citron des Carmes, see Reinette Jaune Hative.

Citron de Saint Gall.

Clammy.

Claremont Pippin, see Easter Pippin.

Cley Pippin.—Yellow, roundish, small, table, first-rate ; October to March.

Claret.—Red, conical, middle-sized, kitchen ; December to January.

Coates's, see Yorkshire Greening.

Clove Pippin.—Red-russet, oblate, middle-sized, table, second-rate ; August.

Cluster Pippin, see Cluster Golden Pippin.

Cluster, Streaky.

Clydesdale.

Cobham.—Greenish red, roundish, middle-sized, kitchen and table, second-rate ; November to January. Good bearer, allied to Ribston Pippin.

Cob Thorn Greening.

Coccagee.—Yellow, ovate, middle-sized, cider, first-rate ; October. One of the most esteemed old cider apples.

Coccagee, New.

Cockle Pippin (Nutmeg Cockle Pippin, Nutmeg Pippin, White Cockle Pippin).—Brownish yellow, ovate, middle-sized, table, first-rate ; January to April. Good bearer.

Cockpit.—Yellow, roundish, middle-sized, kitchen, second-rate ; December to March.

Codlemay.—Pale yellowish red, conical, middle-sized, second-rate.

Codlin, Betley.—Yellow and brownish red, conical, middle-sized ; October to January.

Codlin, Carlisle.—Yellow, conical, small, kitchen, first-rate ; August to December.

Codlin, Clarke's.—Yellow, conical, middle-sized, kitchen, indifferent ; November.

Codlin, Dutch (Chalmers's Large).—Yellow, roundish, large, kitchen, first-rate ; August to September.

Codlin, French.—Yellow, conical, large, kitchen, second-rate ; August to September.

Codlin, Kentish.—Greenish yellow, conical, large, kitchen, first-rate ; August to September.

Codlin, Keswick.—Greenish yellow, conical, large, kitchen, first-rate ; August to September. Fit for use almost before any other, and good bearer. Raised near Keswick, in Cumberland.

Codlin, Kilkenny.—Yellow, round, large, kitchen, first-rate ; August to September.

Codlin, Kinnoul.

Codlin, Knight's, see Wormsley Pippin.

Codlin, Manks (Irish Pitcher, Irish Codlin).—Pale yellow, conical, large, kitchen, first-rate ; August to October.

Codlin, Nelson (Nelson, Backhouse's Lord Nelson).—Greenish yellow, conical, large, kitchen ; September to October.

Codlin, Old English (English Codlin).—Pale yellow, conical, middle-sized, kitchen, first-rate ; August to October.

Codlin, Round.

Codlin, Royal.

Codlin, Spring Grove.—Palish yellow, conical, middle-sized, kitchen, second-rate ; July to September. Raised by Sir J. Banks early this century.

Codlin, Tarvey.—Yellowish green, conical, large, kitchen ; September to November. Raised from Manx Codlin seed by Sir G. I. Mackenzie, of Coul, N.B.

Codlin, Tottenham Park.

Codlin, Transparent.—Pale yellow, conical, large, kitchen, September. Brought into notice in 1805 by T. Thompson, Esq., of Norwich.

Codlin, Winter.—Green, conical, middle-sized, kitchen, first-rate ; September to February ; great bearer.

Cœur d' Ane.—Cider.

Cœur de Bœuf.—Darkish red, calville-shaped, large, kitchen, second-rate ; November to December.

Cœur de Pigeon, see Pigeonet.

Coing.

Cole (Scarlet Perfume).—Red, roundish, large, kitchen and table, second-rate ; August to September.

Collin's Keeper.—Greenish yellow, roundish, large, kitchen ; January.

De Coloma.—Streaked, oblate, small, table, second-rate ; September.

Colonel Harbord's Pippin.—Yellowish green, conical, large, kitchen, first-rate ; November to January. Raised by Col. Harbord, second Lord Suffield, of Blickling, Norfolk.

Colonel Vaughan's.

Compote, see Padley's Pippin.

Concombre Ancien.

Concombre des Chartreux.

Conquest De Wigors.—Pale yellow, roundish, middle-sized, table, second-rate ; January to March.

Constanzer. *Constant Bearer.*

Conway.

Copmanthorpe Crab, see Dutch Mignonne.

Coquerel Plat.—Cider.

Corianda Rose, see Court-pendu Plat.

Corlie's Sweet. *Corn.*

Core, Common.

Cornish Aromatic.—Russet red, roundish, large, table, second-rate ; October to January.

Cornish Crab. *Corse's Favourite.*

Corstorphine.—Pale yellow, conical, middle-sized, second-rate ; September to October.

Cos. *Costard*, see Catshead.

Coul Blush.—Yellowish red, conical, middle-sized, kitchen and table, second-rate ; October. A good bearer.

Court-pendu Plat (Court-pendu, do. Extra, do. Plat Rougeatre, do. Rond Gros, do. Rond tres Gros, do. Rond Rougeatre, do. Rose, do. Musque, do. Rouge Musque, Corianda Rose, Pomme de Berlin, Carnon's Apple, Wollaton Pippin, Russian, Princesse Noble Zoete.—Darkish red, oblate, middle-sized, table, first-rate; December to April; an excellent bearer, blossoms late, and thereby generally escapes spring frosts. The name (Court-pendu) was given because the fruit, owing to its very slender stalks, always hangs downwards.

Court-pendu, Ayrshire.

Court-pendu Dore, see Golden Reinette.

Court-pendu Gris, see Fenouillet Rouge.

Court-pendu Noir.—Darkish red, round, middle-sized, kitchen; December to March.

Court-pendu Rouge.

Court-pendu Rouge et Gris.

Court of Wick (Fry's Pippin, Golden Drop, Knightwick Pippin, Wood's Huntingdon, Phillips's Reinette, Wood's New Transparent, Week's Pippin, Yellow.)—Yellow, oblate, small, table, first-rate; October to March. A handsome regularly-formed dessert fruit of excellent quality. Raised from a Golden Pippin seed, at Court de Wick, in Somersetshire.

Court of Wick, Scarlet.

Cousham.

Coussinette, see Pigeonette.

Coustard, see Catshead.

Cow's Snout.—Greenish yellow, oblong, large, kitchen, second-rate; August to September.

Craigie.—Green and brownish red, oblate, large, kitchen; January to April.

Cram Apple.

Cray Pippin.—Straw-coloured red on sunned side, below middle size, conical and rather angular, table,

first-rate ; October and November. Raised in 1812 by R. Waring, Esq., at St. Mary's Cray, Kent.

Creighton. *Crimson Pippin.*

Crofton, Early, see Irish Peach.

Crofton, Scarlet (Red Crofton).—Brownish red, oblate, middle-sized, table, first-rate ; October to December. An Irish apple.

Crofton, White (White Summer Crofton, Early White Crofton).—Pale brownish red, oblate, middle-sized, table, second-rate ; October.

Croom Pippin.—Yellow, roundish, small ; December to January.

Cumberen.

Cumberland Pippin.—Palish green, calville-shaped, middle-sized, kitchen ; December.

Cumberland Spice. *Curtis.*

Custard, White.

Cyder Sop.—Yellow and brownish red, roundish, ovate, middle-sized, cider.

Dainty, see Hoary Morning.

Damelot.—Yellow, roundish, small, cider ; October.

Damelot Vert.—Green, roundish, middle-sized, cider ; January.

Danziger Kantapfel.—Darkish red, roundish, middle-sized, kitchen, second-rate ; November to December.

Darleston Pippin.

Davis's Pippin.

Darlington Pippin.—Green, oblate, middle-sized, second-rate.

Delaware, see Trumpington.

Deptford Inn.—Brownish red, roundish, small, table, first-rate ; November to January.

Derbyshire.—Pale yellowish red, ovate, middle-sized, kitchen ; November to March.

Descibus.—Yellow, oblate, middle-sized, indifferent ; November.

Desjean Muscat.—Tree cankers.

Deux Ans, Hunt's.—Green, conical, middle-sized, table, second-rate ; 2 years.

Deux Ans, Hambledon.—Greenish red, roundish, large, kitchen and table, first-rate ; January to May ; a valuable sort for sound keeping.

Deux Ans, Somersetshire.—Reddish yellow, conical, small, cider.

Deux Ans, Wickham's.—Green and yellowish red, roundish, middle-sized, table, second-rate ; January to May.

Devonshire Docker's.—Streaked, ovate, middle-sized, table, second-rate ; December to January.

Devonshire White Sour (White Sour, Dredges Early Summer).—Greenish yellow, oblate, small ; August.

Dewit, see Doctor.

Diepe Kopjis, see Little Hollow Crown.

Devonshire Wilding.—Yellow, roundish, small, cider ; December to January. Very acid.

Dickson's Greening.—Green, roundish, middle-sized, kitchen ; December to February.

Dimmock's Red.

Docker's Seedling.—Streaked, ovate, middle-sized, table, second-rate ; November to January.

Doctor (Dewit, White Doctor, Yellow Doctor).—Yellow-streaked, roundish, middle-sized, table, second-rate ; October to January.

Doctor Harvey.

Doctor Harvey (of some,) see Waltham Abbey Seedling.

Doctor, Red.

Dog's Snout.

Dolgoi Squoznoi.—Pale green, pearmain-shaped, middle-sized, table, second-rate ; August.

Domine.

Dominiska.

Donallan's Seedling.

Donville.

Doonside.

Dore.

Double Blossomed.

Double Paradys.—Streaked, roundish, middle-sized, indifferent.

Double Pepin.

Double Rouge de Paradys.—Round, ovate, small, indifferent; November to January.

Double Sucre de Marseilles.—Russet, roundish, small, table, second-rate; November to January.

Double Bearing.

Douce de Bolwiller.—Brownish red, pearmain-shaped, middle-sized, kitchen, cider, second-rate; November to December.

Douce Morelle (Peau de Vache).

Douxveret Gris Gros.—Greenish yellow, roundish, small, cider; December.

Douxveret Dore.

Doux Amer.—Pale yellow, roundish, small, cider; December.

Doux Chair.—Cider.

Doux Eveque.—Cider.

Doux a Laquet.—Cider.

Doux, Le Gros.—Cider.

Doux a Trochet, Gros.—Cider.

Doux Saint Martin.—Cider.

Doux Vernet.—Cider.

Downton (Knight's Golden Pippin, Elton Pippin, Elton Golden Pippin, Knight's Pippin, Saint Mary's Pippin).—Yellow, roundish, small, table, second-rate; November to January. Hybrid between Orange and Golden Pippins, raised by Mr. Knight.

Dowell Pippin.—In form like Ribston, green russeted, table, first-rate; October to January. Raised in 1810 by R. Dowell, Esq., of Braygrove, Berks.

Downy, see Hoary Morning.

Doxey.

Doyenne.—Yellow, roundish, large, cider ; October to January. Acid.

Drap d'Or (Bay Apple, Bonne de Mai).—Yellow, roundish, large, kitchen, second-rate ; October to December. Handsome, but proves of an inferior quality.

Drap d'Or, see Reinette Jaune Hative.

Dredge's Beauty of Wilts, see Harvey's Pippin.

Dredge's Early Summer, see Devonshire White Sour.

Dredge's Emperor.

Dredge's Fair Maid of Wishford.

Dredge's Fame.

Dredge's Lord Nelson.

Dredge's White Lily, see Devonshire Buckland.

Duke d'Arsel, see Old Nonpareil.

Duchess of Hamilton.

Duchess of Oldenburgh.—Streaked, roundish, middle-sized, table, first-rate ; September. Of Russian origin.

Duchess of York's Favourite.—Yellowish red, oblate, small, table, second-rate ; November to December.

Dutch Pippin.

Duke of Beaufort's Pippin.—Streaked, conical, middle-sized, kitchen, second-rate ; Oct. to December.

Duke of Gloucester, Hunt's (Hunt's Nonpareil).—Russet, roundish, ovate, small, table, first-rate ; November to March. Raised from a Nonpareil seed by Dr. Fry, of Gloucester.

Duke of York's, Newbold's, see Rymer.

Dumbarton Pippin.

Dumelow's Seedling.—Yellow and red, roundish, large, kitchen, first-rate ; November to March. An excellent kitchen apple, not apt to shrivel, nor loose its briskness. Raised by Mr. Dumelow, nurseryman, Derby.

Duncan (Lord Duncan).—Yellowish red, roundish, middle-sized, kitchen, second-rate; October to January.

Dundee, see Golden Reinette.

Duquesnay.

Dutch Mignonne (Reinette Doree of the Germans, Pomme de Laak, Grosser Casseler Reinette, Pater-noster Apfel, Stettin Pippin, Copmanthorpe Crab).—Yellowish red, roundish, middle-sized, kitchen and table, first-rate; December to April. Great bearer, and of first-rate quality. A Dutch apple, imported about 50 years ago.

Dwarf Apple of Armenia.

Early Almond (White Codlin).

Early Bowhill (Lucombe's Early Bowhill).

Early Cleandrinking.

Early Harvest (Prince's Harvest, Yellow Harvest, Large Early, July Early Pippin, Early French Reinette of the Americans).—Palish yellow, roundish, middle-sized, table, first-rate; August. Flesh white, crisp, tender, with brisk rich flavour.

Early Gowie.

Early Julien.—Yellow, conical, small, table, second-rate; August. A Scotch dessert apple.

Early Marrow.

Early Red.—Red, oblate, large, kitchen, second-rate; September to October.

Early Red Streak.

Early Sweet Red Streak.

Early Wax.—Yellow, oblong, small, table, second-rate; August.

Easter, White (Paasch Apfel).—Palish yellow, conical, middle-sized, kitchen and table, second-rate; January to April.

Easter Pippin (French Crab, Young's Long Keeper, Claremont Pippin, Ironstone Pippin).—Green, roundish, middle-sized, kitchen and table, second-rate; 2

years. Probably a French apple, but known in England full 50 years.

Ecarlatine.

D' Eclat.

Edel Konig (Roi tres Noble).—Red, calville-shaped, middle-sized, kitchen ; October to November.

Edinburgh Cluster (Sir Walter Blacket's Favourite).—Yellow, ovate, middle-sized, kitchen, second-rate ; November to January.

Egg, see White Paradise.

Eikenhagar, Willers.

Elizabet, see Golden Reinette.

Eldon Pippin.—Yellow and brownish red, roundish, middle-sized, table, first-rate ; January to April.

D' Ete.

Embroidered Pippin (Reinette Brodee).—Yellow and brownish, roundish, small, table, second-rate ; November to January.

Emperor Alexander, see Alexander.

Englise Pippin, see Golden Reinette.

Enkhing.—Palish green and red, ovate, small, indifferent ; December to March.

Enkhuizer Aagtie, Soete.—Yellowish red, ovate, middle-sized, second-rate ; October to January.

Epine d' Ete.

D' Espagne, see Reinette Blanche d' Espagne.

Essex Pippin.—Yellow, round, small, table, first-rate ; October to February. Allied to the Golden Pippin.

Evans's Valuable.

Eve Apple (of Ireland), see Early Red Margaret.

Eve Apple, see Trumpington.

D' Eve, Pomme.

Everlasting.—Streaked, roundish, small, indifferent, January to May.

Everlasting Bearer.

Eyelet, Yellow.—Pale yellow, oval, middle-sized, cider ; October to February.

Faaremules.

Fail me Never, see Margil.

Fair Circassian.

Fair Maid of France.—Streaked, roundish, middle-sized, indifferent.

Fair Maid of Taunton.—Yellowish red, ovate, oblate, small, table, second-rate ; November to January.

Fall Pippin, see Reinette Blanche d' Espagne.

Fall Pippin, Cobbett's, see do.

Fall Pippin, Large, see do.

Fall Pippin, Sudlow's, see Franklin's Golden Pippin.

Fallawater.—Green and brownish red, conical, large, table and kitchen, second-rate ; January ; possesses, in some degree, a Newtown Pippin flavour.

Famagusta.

Fameuse, see De Neige.

Fame.

Fanarike.—Green, ovate, middle-sized, indifferent.

Farleigh Pippin.—Yellowish green, oblong, ovate, middle-sized, table, first-rate ; January to April. Obtained by Mr. Kirpe, from Farleigh, in Kent.

Farthing's Pippin.—Green, oblate, small, indifferent ; November.

Faros, Grand.—Yellowish red, oblong, large, indifferent ; November to January.

Faros, Gros (Faros).—Red, oblate, middle-sized, table, second-rate ; December to March.

Faros, Petit.

Faux Varin.—Cider.

Fearn's Pippin (Ferris Pippin, Clifton Nonesuch).—Red, oblate, middle-sized, table and kitchen, first-rate ; November to February ; a good bearer.

Fenouillet Gris (Fenouillet d'Or Gros, Pomme d'Anis).—Russet, roundish, small, table, second-rate ; January to April ; has a perfumed anise flavour. A French apple.

Fenouillet Jaune, Yellow Fenouillet.

Fenouillet Rouge (Bardin, Court-pendu Gris, Fenouillet Gris of some).—Russet red, roundish, small, table, first-rate; November to March.

Fer, De, see Iron Apple.

Feuille d'Aucuba.

Figue.

Figue sans Pepins, like Reinette Jaune Sucree.

Finale, Pomme, see Male Carle.

Five Crown Pippin, see London Pippin.

Five Pound.

Flander Pippin.

Flat Anderson.

Flax.

Fletcher's Kernel.—Yellow, roundish, middle-sized, table, first-rate; November to January.

Fletcher's Abingdon Pippin.

Flower of Kent.—Greenish red, oblate, large, kitchen; November to January.

Fleur de Praireal.—Yellow and green, oblate, middle-sized, cider; November to January.

Formosa Pippin, see Ribston Pippin.

Ford's Seedling.

Flower of the Town (Flowery Town, Red Streak of Blackhouse).—Streaked, roundish, middle-sized, kitchen, second-rate; September to November; indifferent in quality, though a good bearer.

Forest Pippin.—Yellowish red, ovate, oblate, middle-sized, kitchen.

Forman's Crew.—Yellow russet, conical, small, table, first-rate; November to April; very subject to canker. Raised by T. S. Forman, Esq., near Merthyr Tydvil, in Glamorganshire.

Fouillet, De.—Pale greenish red, conical, large, kitchen; January to April.

Foxley.—Yellow, oval, small, cider.

Foxley Pippin.—Orange, roundish, small, cider, table; November to February.

Foxley Queening.

Fox Whelp.—Dark red, ovate, middle-sized, cider, first-rate.

Framboise.—Streaked, calville-shaped, middle size, kitchen, second-rate; November to March.

Francatu.

Franché Pepin.—Yellow, roundish, middle-sized, table, first-rate; November to March.

French Crab, see *Easter Pippin*.

French Crab, American (Metoisee).—Streaked, roundish, middle-sized, kitchen, second-rate; December to April.

French Pippin, see *French Russet*.

French Sussex.

Frequin Blanc.

Fry's Pippin, see *Court of Wick*.

Fulwood (Fulwood Green).

Fulwood Dutch (Late Fulwood).—Green, oblong, large, kitchen, first-rate; December to May.

Fulwood, Early.

Ganges.

Garçon's Apple, see *Court-pendu Plat*.

Garret Pippin, see *Borsdorffer*.

Geache's Favourite.

Geant.

Gelee d'Ete.—Pale yellow, conical, middle-sized, table, second-rate; August.

General Wolf.—Brownish yellow and green, flat, conical, large, kitchen and table, second-rate; November to January. Resembles *Reinette du Canada*.

George the Fourth, Burgess's.

George the Fourth, Myatt's.

Gestreifter Sommer Cousinos.

Gestreifter Sommer Zimptapfel.—Yellowish red, ovate, small, table, first-rate; August to September.

Giant.

Gilliflower.—Streaked, roundish, middle-sized, kitchen, second-rate; October to February.

Gilliflower, Cornish (Cornish July flower, Pomme Regelans).—Dark-green and yellow, ovate, middle-sized, table, first-rate; December to May. The best of apples, but a bad bearer. Discovered in a cottage garden near Truro about 1812.

Gilliflower, Summer (Summer July Flower, Russian).—Streaked, roundish, large, table, second-rate; September; a great bearer.

Gilpin (Carthouse).

Girdler's Large.

Girkin Pippin, see Wyken Pippin.

Glace, De (Transparente).

Glace Blanche.—Pale green, conical, middle-sized, cider; December.

Glace Rouge, see Barcelona Pearmain.

Glace de Zelande, see White Astrachan.

Glamis Castle, see Tower of Glamis.

Glasbury, Norman.—Pale yellow, ovate, small, cider.

Gloria Mundi (American Gloria Mundi, New York Gloria Mundi, Glazenwood Gloria Mundi, Monstrous Pippin, American Mammouth, Baltimore of some).—Greenish yellow, roundish, large, kitchen, first-rate; November to January.

Glory of Boughton.—Yellow, round, large, kitchen; October.

Glory of England.

Glory of the West.

Glory of York, see Ribston Pippin.

Gloucester, White, of Virginia.

Gogar Pippin (Stone Pippin of some).—Pale green, oblate, middle-sized, table, second-rate; November to March. A Scotch apple, from Gogar, near Edinburgh.

Golde Gulderling.

Golden Ball.—Yellowish red, roundish, large, kitchen, second-rate; August to September.

Golden Burr.

Golden Drop, see Court of Wick.

Golden Drop, Coe's.—Yellow, ovate, small, table, first-rate; January to May. An excellent dessert apple.

Golden Harvey (Brandy).—Russet, yellow, roundish, small, table and cider, first-rate; December to May; exceedingly rich. The original Harvey apple was green, and named after the celebrated Dr. Gabriel Harvey.

Golden Harvey, Pitmaston.

Golden Harvey, Siberian.

Golden Janet.

Golden Knob.—Russet, conical, small, table, second-rate; December to February.

Golden Mundi.

Golden Mundi, see Golden Russet.

Golden Noble.—Yellow, round, large, kitchen, second-rate; September to October. Handsome.

Golden Pippin (Old Golden Pippin, English Golden Pippin, Balgone Pippin, Balgone Golden Pippin, Milton Golden Pippin, Bayfordbury Pippin, Russet Golden Pippin, Herefordshire Golden Pippin, London Golden Pippin, Warter's Golden Pippin, American Plate, Pepin d'Or, Pomme d'Or, Koenig's Pippelin, Reinette d'Angleterre).—Yellow, roundish, small, table, first-rate; November to April. Requires a wall in most situations, and its superior richness deserves such protection.

Golden Pippin, Boyer's, see Boyer's Russet.

Golden Pippen, Camberwell.

Golden Pippin, Cluster (Cluster Pippin, Turin Cluster Pippin, Thickset).—Yellow, oval, small, table, second-rate; November to March. Fruits often joined in pairs.

Golden Pippin, Elford.

Golden Pippin, Elton, see Downton.

Golden Pippin, Franklin's (Sudlow's Fall Pippin).

—Yellow, oval, small, table, second-rate ; October to December. Good bearer. An American apple, raised early in this century.

Golden Pippin, Hughe's (Hughe's New Golden Pippin).—Yellow, roundish, small, table, first-rate ; December to February. Deserves high recommendation.

Golden Pippin, Kirke's, see New Golden Pippin.

Golden Pippin, Knight's, see Downton Pippin.

Golden Pippin, New (Kirke's Golden Pippin, New Cluster Golden Pippin, Dredge's Golden Pippin).—Yellow, roundish, small, second-rate ; December to March. A great bearer, but inferior in quality. Raised by Mr. Kirke, of Brompton Nursery, about 1820.

Golden Pippin, Rival, see Aniseed.

Golden Pippin, New Taunton.

Golden Pippin, Scarlet.

Golden Pippin, Screveton.—Yellowish red, roundish, small, table, first-rate ; November to April.

Golden Pippin, Seedling.—Yellow, roundish, small, table ; October to February.

Golden Pippin, Summer (Summer Pippin, of some).—Yellow, ovate, small, table, first-rate ; August to September ; an excellent summer dessert apple.

Golden Pippin, Tunbridge.

Golden Pippin, Winyard.—Like the Golden Pippin, but not so rich.

Golden Worcester.—Orange, roundish, middle-sized, cider ; December to January.

Golding. *Goodyear Pippin*.

Gooseberry.—Yellow, roundish, oblate, large, kitchen, first-rate ; November to August.

Graafen.

Grandessen.—Pale greenish red, ovate, middle-sized, second-rate ; September ; a sort of pigeonnet.

Grand Sachem.

Grange.—Yellow, roundish, small, second-rate ; October to February.

Grange's Pippin, see *Grange's Pearmain*.

Grauch, Aigre.—Cider.

Grauch Douce.—Streaked, roundish, large, cider ; October to November.

Gravenstein (Grave Slije, Sabine of the Flemings).—Streaked, roundish, large, kitchen, first-rate ; October to December. About a century old ; first raised at Gravenstein in Holstein.

Great Milton Pippin.

Greasley's Seedling.

Green.—Green, round, middle-sized, kitchen, first-rate ; January to June ; keeps very sound ; less acid than the Easter Pippin or French Crab, but not so juicy.

Green Balsam.—Yellowish green, roundish, middle-sized, kitchen ; December to January.

Green Cosings, see *Rymer*.

Green Everlasting.—Green, roundish, small, indifferent ; March to April.

Green Eyelet.—Green, roundish, small, cider.

Green Longlast.

Green Pippin. *Green Virgin*.

Gregaire,

Gregson, see *Catline*.

Grey House, see *House*.

Gribble.

Grimshaw's Crab.

Grimsteen.—Yellow, conical, small, second-rate.

Grise.—Green russet, roundish, table, first-rate ; November to March.

Gros Binet.

Gros Bondy, see *de Rateau*.

Gros Bohu.

Grosse Verte.—Green, roundish, large, kitchen ; October to February.

Grosse Bonne.

Grosse a Cuire.—Yellow, roundish, middle-sized, kitchen; November to February.

Grosse Pomme d'Amerique.

Grosse Pomme Noir d'Amerique.

Grosse Pomme d'Automne.

Grosser Edler Prinzessin.

Grosser Rheinischer Bohn Apfel.

Grosser Wiener.

Grummage, see Birmingham Pippin.

Grunken Bergers Krachapfel.

Guillot Roger.—Cider

Grushovy Naliv.—Pale yellow, ovate, middle-sized, table, second-rate; August. A transparent Russian apple.

Halliday's Pippin.

Hall Door.—Yellowish red, oblate, middle-sized, table, second-rate; December to March.

Hall's Watlington Seedling.

Hamilton Pippin.

Hampshire Greening.

Hampstead Sweeting.—Greenish yellow, ovate, middle-sized, cider.

Hampshire Yellow, see King of the Pippins.

Hampton Candied Heart.

Hanging-down.—Cider.

Hanovre, De, see Pearson's Plate.

Haggerston Pippin.—Greenish red, roundish, middle-sized, table, first-rate; November to April.

Hanwell Souring.—Greenish yellow, conical, middle-sized, kitchen; December to March. Believed to have been raised at Hanwell, near Banbury.

Hard Pippin.—Green and palish red, ovate, small, cider.

Harrison.

Harrison's Newark.—Yellowish red, conical, small, cider.

Harvey's Pippin, Dredge's Beauty of Wilts.

Harvey, Red.

Hative Pomme, see Summer Stibbert.

Hautbois.

Hans Mutterchen, see Mere de Menage.

Haute Bonte.

Hawthornden (White Hawthornden, Red Hawthornden).—Pale yellow, roundish, large, kitchen, first-rate ; October to December ; abundant and early bearer. The original tree is still at Hawthornden, near Edinburgh.

Hawthornden, Irish.

Haynes's Pippin.

Hay's Early.—Yellow streaked, oblate, middle-sized, kitchen ; August.

Heathfield's French Apple.

Hebe.

Heidelocher, see Hoskreiger.

Herefordshire Goose.

Herefordshire Monster.—Yellow, roundish, small, cider ; December.

Hesketh's Pippin.—Yellow, conical, large, kitchen, October to January.

De Herison.—Cider.

Hen and Chickens.

Henhouse.

Henry's Weeping Pippin.—Yellow, oval, small, table, second-rate ; December to February.

Herbert Pippin.

Hermitage Pippin.

De Heron.

Hick's Fancy, see Early Nonpareil.

Hieville Rouge.

Hillingdon Seedling.

Hill's Seedling.—Pale green, oblate, large, kitchen, second-rate ; August to September.

Himbeerapfel.

Hanberry, Pippin, see *Hollandbury*.

D'Hiver.—Yellow, oblate, middle-sized, kitchen, second-rate; January to April.

Hoare's Seedling.—Pale greenish red, roundish, large, kitchen; December to January.

Hoary Morning (Dainty, Downy, Sam Rawlings).—Streaked, roundish, large, kitchen, second-rate; October to March. A native of Somersetshire.

Hogshead.—Greenish yellow, ovate, cider.

Hollandbury (Hawberry Pippin, Howberry Pippin, Horsley Pippin, Le Beau Rouge, Bonne Rouge, Kirke's Scarlet Admirable).—Reddish yellow, roundish, large, kitchen, second-rate; November to January; handsome.

Holland Kruger.—Yellow and greenish red, roundish, middle-sized, kitchen, second-rate; December to February.

Holland Pippin.—Yellow, roundish, oblate, large, kitchen, first-rate; November to March.

Holbein.

Hollow Crowned Pippin (Hollow Eyed Pippin).—Yellow, roundish, middle-sized, kitchen; November to February.

Horne's Large.—Streaked, roundish, large, kitchen; October to December.

Honey Greening.

Hormead Pippin, see *Hormead Pearmain*.

Hood's Seedling.

Horner's Bitter Sweet.—Cider.

Horselin.—Pale yellow, ovate, middle-sized, table, second-rate; November to December.

Hoskreiger (Heidelocher).—Green, roundish, large, kitchen, first-rate; November to April; good bearer.

House (Grey House).—Greenish red, oval, small, cider; January.

How's Pippin.—Russet, oblate, middle-sized, table, second-rate; October to December.

Howberry Pippin, see Hollandbury.

Horsley Pippin, see Hollandbury.

Hanau, Pomme de, see Rosackerle.

Hunt's.

Hunt's Fine Green Pippin.

Hunthouse. — Pale yellow, oblong, middle-sized, kitchen ; December to March. Good bearer.

Hunthouse Large.

Huntingford. — Red, conical, middle-sized, kitchen ; January to April. Very bright colour.

Hutching's Seedling, see Sugarloaf Pippin.

Hutching's Late Seedling.

Hutchinson's Spotted. — Yellowish red, oblate, small, table, first-rate ; November to December.

Hyde Park. *Hyde Pippin*.

Imperial, Livesey's.

Incomparable. — Greenish yellow, calville-shaped, large, kitchen ; October.

Incomparable, Barton's.

Incomparable, Egremont's.

Incomparable, Hay's.

Incomparable, Ives's.

Incomparable, Kirk's.

Incomparable, Lewis's. — Yellowish red, conical, large, table, second-rate ; December to February.

Incomparable, Sharp's.

Ironstone Pippin, see Easter Pippin.

Ingestrie, Red. — Yellowish red, ovate, small, table, first-rate ; October to November. This and the next were raised by Mr. Knight in 1800, being hybrids between the Orange and Golden Pippin.

Ingestrie, Yellow. — Yellow, oval, small, table, second-rate ; September to October. Good bearer.

Irish Pitcher, see Mank's Codlin.

Inimitable.

Iron Apple (Pomme de Fer). — Brownish green, small, kitchen and table, second-rate ; a year.

Isle of Wight Pippin (Isle of Wight Orange, Orange Pippin).—Yellow, oval, small, table, first-rate, September to January.

Isleworth Crab (Brentford Crab).—Pale yellow, roundish, middle-sized, second-rate ; October.

Isted's Plate Apple (Isted's).

D'Italie, Pomme, see Massavis.

Ives's Seedling.—Streaked, roundish, middle-sized, kitchen, second-rate ; November to January.

Ivory Pippin.

Jackson's Pippin (Middleton Pippin). — Yellow, roundish, oblate, small, indifferent ; August.

Janurca, see Reinette du Canada.

De Jardy, see Belle Hervey.

Jeannette.

Jean Hure.—Yellow, pear-shaped, middle-sized, cider ; January.

Jeffrey's Seedling.—Yellow, oblate, large, kitchen, October to January.

Jennet, Golden.—Cider.

Jenny Sinclair.—Brownish red, roundish, middle-sized, table.

Jersey.—Red, conical, small, cider ; November to December ; a bitter-sweet.

Jersey Pippin, Saunders's.

Jersey Greening.

Jerusalem, Pomme de, see Pigeon.

Jerwin's Seedling.

John Apple.—Green and yellowish red, pearm, small, cider, first-rate ; December to February. A very old variety.

John Apple, see Northern Greening.

Jollyfield Pippin.

Jolty Kutofsky Naliff.—Pale yellow, conical, small, table, indifferent ; August.

Jonathan.

Jordbaeraeble. — Streaked, ovate, middle-sized,

table; August to September. Danish Strawberry apples.

Jordbaeracble, Kantet.—Red, calville-shaped, middle-sized, kitchen.

Jubilee Pippin.—Conical, above middle size, cream coloured, specked with brown, table and kitchen; Mic. to Christmas. Raised by M. Bland, Esq., from seed sown in 1809.

July Early Pippin, see Early Pippin.

July Flower, see Gilliflower.

July Flower, Cornish, see Cornish Gilliflower.

July Flower, Summer, see Summer Gilliflower.

July Pippin.

Juneating, American Red.

Juneating, Early Red, see Early Margaret.

Juneating, Early Striped, see Early Red Margaret.

Juneating, Large White.

Juneating, Red, see Early Red Margaret.

Juneating, Red and Green.

Juneating, Striped, see Early Red Margaret.

Juneating, White (Owen's Golden Beauty).—Pale yellow, roundish, small, table, first-rate; July to August. A handsome early apple.

Kaiserschumer.—Greenish red, conical, large, kitchen, second-rate; January to February.

Kantjis Apfel.—Russet red, oblate, middle-sized, kitchen, second-rate; January to February.

Keiser.—Brownish green, conical, middle-sized, indifferent.

Kempster.

Kenrick's Red Autumn.

Kentish Fill-basket (Lady de Grey's, Potter's Large, Kentish Pippin of some).—Yellow, green and brown, roundish, large, kitchen, first-rate; November to January.

Kentish Giant.

Kentish Pippin.—Pale yellow and brown, conical, middle-sized, kitchen, first-rate; October to January.

Kentish Pippin (of some), see *Beauty of Kent* and *Kentish Fill-basket*.

Kerkam.

Kernel.—Cider.

Kernel, Dollar's.—Streaked, ovate, small, cider ; October to November.

Kernel, Knotted.—Streaked, ovate, small, cider ; October to November.

Kernel, Skerm's.—Streaked, ovate, small, cider ; October to April.

Kerry Pippin.—Reddish yellow, oval, middle-sized, table, first-rate ; September to October. Good bearer. Long known in the county of Kerry.

Keston Pippin.—Reddish yellow, roundish, small, table, second-rate ; October to December.

Kew Admirable.

King, see *Borsdorffer*.

Knick Pepin.

Kinellan.—Pale green, slightly dotted, yellow red on sunned side, table, good ; December to March. Raised by Sir G. I. Mackenzie, of Coul, N.B.

Kinfaun's Pippin.—Streaked, roundish, middle-sized, second-rate.

King George, see *Borsdorffer*.

King Harry.—Russet, pearm, middle-sized, table, first-rate ; November to January.

King of the Pippins (*Hampshire Yellow*).—Reddish yellow, pearm, middle-sized, kitchen, first-rate ; October to January. A good bearer, and very handsome. Brought into notice by Mr. Kirke, of Brompton.

King Robert.

Kingston Black.

Kirke's Fame.

Kirkton Pippin.

Kisking.

Kleiner Fleiner.

Knifly Naliff.

Knight's Pippin, see Downton.

Knight's Large.—Yellowish red, roundish, large, kitchen ; September to October.

Knight, Pomme.

Knightwick Pippin, see Court of Wick.

Koenig's Pippelin, see Golden Pippin.

Konigliche Taubling, see Pigeonet.

Koppel.

Korishnory.

Krappe Kruin.—Russet, conical, middle-sized, kitchen, first-rate ; October to March.

Krizapfel.—Pale green, conical, middle-sized, table, second-rate ; December. A Russian apple, somewhat transparent.

De Laak, see Dutch Mignonne.

Lady Apple (of the Americans), see Api Petit.

Lady de Grey's, see Kentish Fill-basket.

Lady's Finger, see White Paradise.

Lady Louisa Pippin.—Pale yellow, oblate, small, indifferent ; December.

Lady of the Wemys.

Lancashire Crab, see Minshul Crab.

Lancashire Gap (Shireling).—Yellow, oblate, middle-sized, kitchen ; November to February.

Lancashire Witch.—Yellowish red, oblate, middle-sized, kitchen, second-rate ; October to December ; handsome.

Lancaster Crab, see Minshul Crab.

De Lande (Fleur de Prairial).—Streaked, oblong, large, kitchen ; September to October.

Langer Rother Himbeer Apfel, see White Queen-ing.

Larden.

Large Early, see Early Harvest.

Large Yellow, see Early Harvest.

Large Re, New.

Late Bloomer.—Cider.

Lavendel Pipping.

Lawman's.—Yellow and brownish red, ovate, middle-sized, table, second-rate ; March to June.

Lawrence's New White Pippin.—Pale green, conical, middle-sized, second-rate ; December to February.

Leadington, Green.—Green, conical, middle-sized, kitchen, second-rate ; September to October.

Leadington, Grey.—Yellowish brown, oval, middle-sized, kitchen, second-rate ; October.

Leadington, Large.—Green, oblong, large, kitchen.

Leadington, Monstrous (Green Codlin).—Green, oblong, large, kitchen, first-rate ; October to January.

Leadington, Red.

Leadington, Scarlet.—Red, oblong, middle-sized, kitchen and table, second-rate ; November to February.

Leadington, Stoup.—Yellowish green, oblong, large, kitchen ; September to November.

Leadington, Summer.

Leather-coat, see Royal Russet.

Leicester Early.

Leisham's Pippin.

Leixlip Pippin.

Lemon.—Yellow, roundish, middle-sized, table, second-rate ; December to January.

Lemon Pippin (Kirke's Lemon Pippin).—Yellowish green, oval, middle-sized, kitchen and table, first-rate ; October to April.

Lemon Pippin, Knight's.—Yellow, roundish, middle-sized, kitchen and table, first-rate ; November to February.

Lettsom's American.—Reddish yellow, oblate, middle-sized, table, second-rate ; November to January.

Leyden Pippin.—Pale greenish red, roundish, middle-sized, table, first-rate ; August to September. A great bearer, and a good early apple, resembling White Astrachan.

Liestal.

Lievre.

Lily Buckland, see Devonshire Buckland.

Limonella.—Greenish yellow, oval, large, table, second-rate; October; requires a warm climate.

Lincolnshire Holland Pippin (Striped Holland Pippin).—Streaked, roundish, small, kitchen, second-rate; November to February. A Dutch apple.

Little Beauty.—Yellow, oblate, small, indifferent; October to November.

Little Hollow Crown (Diepe Hopjis).—Yellow, oval, small, second-rate; November to December.

Lock's Seedling.—Streaked, ovate, middle-sized, table, second-rate; December to January.

London Pippin (Five Crown Pippin, New London Pippin, Royal Somerset).—Yellow, oblate, middle-sized, kitchen and table, first-rate; November to April; does not shrivel. This is a Norfolk apple.

Long-bois, De (Toilet).—Yellow, conical, small, cider; October; a bitter-sweet.

Long Early.

Long Hanger, Parson's.—Cider.

Long Keeper, Mogg's.—Streaked, oblate, middle-sized, cider; January to March.

Long Keeping Seedling.

Long Keeping Yellow, Kew.

Long Keeping, Young's, see Easter Pippin.

Long May, see White Paradise.

Long Tom, see Sheep's Nose.

Longue.

Longville's Kernel (Sam's Crab).—Pale brownish red, oblate, middle-sized, cider, indifferent. A native of Herefordshire.

Lord Bateman's Dumpling.—Streaked, oval, middle-sized, table, cider, second-rate; August to September; a great bearer.

Lord Duncan, see Duncan.

Lord Nelson, Backhouse's, see Nelson Codlin.

Lord Nelson, Dredge's.

Lord Nelson, Kirke's.—Red, roundish, large, table, second-rate ; November to February ; very handsome, but deficient in briskness.

Lord Northwick's Dutch.

Lourmont Pippin.

Loveden's Pippin, see Old Nonpareil.

Lucombe's Seedling.—Streaked, roundish, large, kitchen, first-rate ; October to February ; a good kitchen apple. Raised by Mr. Lucombe, of Exeter.

Lud's Summer.

Lud's Winter.

Luffness Pippin.

Luiken.

Lushington Pippin.

Lustree, Pomme.—Red, roundish, small, kitchen, indifferent ; November to January.

Madame, Nouvelle.

Maclean's Favourite.—Yellow, roundish, middle-sized, table ; October to January ; of the highest excellence.

Madame, Pomme, see Reinette Grosse d'Angleterre.

Madeleine, see Calville Rouge d'Ete.

Mætapfela Fleurs Tardives, see Spatbluhende.

Maid of the Mill.

Maiden.—Greenish red, roundish, large, second-rate ; November to December.

Maiden's Blush.—Yellowish red, oblate, large, kitchen and table, second-rate ; September to October ; partially overspread with fine red.

Make-him-rich.

Malapias.

Malcolm's Seedling.

Male Carle (Mela di Carlo, Pomme de Charles, Pomme Carle, Pomme Finale).—Greenish red, roundish, middle-sized, table, first-rate ; November to March ;

requires a south wall; and on this it comes short of perfection. An Italian apple, exported largely from Genoa.

Malingre d'Angleterre, see Calville Normande.

Margaret Early Red (Margaret, Margaret Early, Marguerite, Red Juneating, Early Red Juneating, Striped Juneating, Early Striped Juneating, Striped Quarrenden, Eve Apple of Ireland, Summer Traveller).—Streaked, ovate, middle-sized, table, first-rate; August; one of the best early apples. This is first noticed in 1688 by Ray.

Margaret, of Miller, (Summer Pippin).

Margaret, Yellow (White Margaret, Yorkshire Margaret).

Margil (Never-fail, Munche's Pippin).—Yellowish red, ovate, small, table, first-rate; November to February. Good bearer; approaches the Ribston Pippin flavour.

Malingre, see Calville Malingre.

Marin Onfroi.—Cider.

Marmalade Pippin (Althorp Pippin).—Yellow, oblong, middle-sized, kitchen, second-rate; October to January.

Marmorister Sommer Pepping.—Red streaked, ovate, middle-sized, kitchen, second-rate; September.

Marygold.

Marygold Pippin.—Yellow, ovate, middle-sized, indifferent; October to November.

Mary Greed's.

Master's Seedling.—Pale yellow, conical, small, table, second-rate; January to March.

Mason's White (Mason's Early).—Pale yellow, conical, middle-sized, table, second-rate; August.

Massavis (Pommed'Italie).—Greenish brown, ovate, small, cider. A good bearer.

Matchless, see Newton Spitzemberg.

Maucher Rother.

May, see *White Paradise*.

Maude's Seedling Pippin.

May Bloom.

Megginch Favourite, see *Golden Reinette*.

Melrose, White.

Melville Pippin.

Mere de Menage.—Red, roundish, large, kitchen, first-rate; October to January.

Menegere, Hans Mutterchen.

Merveille de Portland.—Yellow, conical, middle-sized, kitchen, indifferent; January to April.

Meuris.

Meuris Pepin.

Michael Henry Pippin.—Yellow, ovate, large, kitchen and table, second-rate; November to February.

Miche, De.—Yellow, ovate, small, cider; December.

Middleton Pippin, see *Jackson's Pippin*.

Miller's Glory.—Streaked, ovate, middle-sized, kitchen, second-rate; December to January.

Millfield.—Like *Golden Reinette*.

Minkler's.

Minchall Crab (*Lancashire Crab*, *Lancaster Crab*).—Yellow, oblate, middle-sized, kitchen, second-rate; December to February; good bearer. Raised at Minchall, in Cheshire.

Moncrieffe.

Moncrieffe, White.

Monkland Pippin.—Yellow, oval, small, indifferent; November; very hardy, and of peculiar form.

Monteith, White.

Mollet's Guernsey Pippin.—Yellow, oblate, small, table, second-rate; December to February; resembles a *Golden Pippin*.

Monstrous Pippin, see *Gloria Mundi*.

Moore's Large Red Winter Sweeting, see *Red Sweet Pippin*.

Morchin's Crab.—Cider.

Morden Bloom.—Yellowish red, oblate, middle-sized, kitchen, indifferent; August to September.

Morden Round.—Yellow russet, round, small, table, indifferent; December to March. Handsome, but not juicy.

Morden Striped.—Streaked, roundish, middle-sized, kitchen, second-rate; November to January.

Moreton.—Cider.

Morgan.

Molasses, see New England Sweeting.

Mortimer.

Mouse.

Motoisee, see American French Crab.

Mother Apple.—Yellow, ovate, small, cider; December; a bitter-sweet. (See *Oslin*).

Motteux's Seedling, see Beachamwell.

Mount Stewart.—Greenish red, oblate, large, kitchen; November to January.

Moulin a Vent.—Yellow, ovate, middle-sized, cider; December.

Moxhay Pippin.—Pale yellow, conical, small, indifferent; October.

Mouche's Pippin, see Margil.

Munster Pippin.—Pale green, conical, large, kitchen; October to January.

Murphy.

Museau de Lievre, see Pigeonette.

Mussellier.

Naked Apple.

Nanny.

Negre Dore.

De Neige (*Pomme Fameuse*, *Sanguineus*).—Pale greenish red, roundish, middle-sized, table, second-rate; November to January; very white flesh. A Canadian apple, named after the village where it was raised.

Nelson, see Nelson's Codlin.

Nelguin, see Reinette d'Aizerna.

Never-fail, see Margil.

Newark King.—Greenish red, pear-shaped, middle-sized, table, second-rate; November to February.

Newark Yellow Pippin.

New England Seek-no-further.

New England Sweeting (Molasses).—Cider.

Newman's Kernel.—Cider.

Newtown Pippin (American Newton Pippin, Large Newtown Pippin, Petersburg Pippin, Green Newton Pippin).—Greenish yellow, roundish, middle-sized, table, first-rate; January to May. Excellent, but requires a wall or good situation. Sent from New York about 1830.

Newtown Pippin, see Alfriston.

Newton Pippin, Lord Gwydir's, see Alfriston.

Newton Pippin, Hunt's Green.

Newton Pippin, Yellow (Large Yellow Newton Pippin).—Yellow, roundish, large, table, first-rate; December to March. Ripens better than the Green in this climate.

New Rock Pippin.—Green, round, middle-sized, table, first-rate; January to May. Raised by Mr. Pleasance, of Barnwell, near Cambridge.

New York.

New York, Early.

New York, Gloria Mundi, see Gloria Mundi.

New York Pippin.

Noblesse de Gand.—Pale yellow, ovate, middle-sized, second-rate; December to January.

No Core Apple.

Noire (Pomme d'Amerique).

Nonpareil, see Old Nonpareil.

Nonpareil, American.—Greenish-brown, roundish, middle-sized, table, second-rate; December to February.

Nonpareil d'Angleterre, see Old Nonpareil.

Nonpareil, Antrim.—Streaked, roundish, small, table, second-rate; December to March.

Nonpareil, Braddick's (Ditton Nonpareil).—Green, roundish, small, table, first-rate; January to April. Keeps sound; abundant bearer. Raised by J. Braddick, Esq., of Thames Ditton.

Nonpareil, Cockfield.

Nonpareil Codlin.

Nonpareil, Early (Stagg's Nonpareil, Hick's Fancy, New Nonpareil).—Greenish yellow, oblate, small, table, first-rate; October to December. Brisk flavoured. Raised about seventy years ago by Stagg, a nurseryman at Caister, Norfolk.

Nonpareil, English, see Old Nonpareil.

Nonpareil, Downton.—Green, russet, roundish, middle-sized, table, first-rate; December to April. Sharp rich flavoured.

Nonpareil, Fair's.—Greenish yellow, oval, small, table, first-rate; November to February.

Nonpareil, Flat.—Russet, oblate, small, table, first-rate; January to April.

Nonpareil, Formosa.

Nonpareil, Frognal.

Nonpareil, Golden.—Yellow, russet, round, small, table, first-rate; December to February. Handsome.

Nonpareil, Golden Russet.

Nonpareil, Green (New Green Nonpareil).—Green, round, small, table, second-rate; January to April.

Nonpareil, Hare's.

Nonpareil, Hunt's, see Duke of Gloucester.

Nonpareil, Martin.—Yellow, russet, ovate, small, table, second-rate; December to March. Received as a Crabstock in 1795, by Rev. G. Williams, of Martin Hussington, near Worcester.

Nonpareil, New, see Early Nonpareil.

Nonpareil, Old (Nonpareil, English Nonpareil),

Nonpareil d'Angleterre, Duc d'Arsel, Hunt's Nonpareil, Loveden's Pippin, Grune Reinette, Pomme Poire of some, Reinette Nonpareil). — Greenish yellow, roundish, small, table, first-rate; January to May. Peculiar and excellent flavour; bears well as a standard in a favourable situation, otherwise deserves a wall. Probably of French origin, but known here in Queen Elizabeth's reign.

Nonpareil, Petworth.

Nonpareil, Pitmaston.—Pale green russet, roundish, middle-sized, table, first-rate; December to February. Raised by J. Williams, Esq., of Pitmaston, near Worcester.

Nonpareil, Redding's.—Russet, green, roundish, small, table, first-rate; December to March. Abundant bearer, brisk flavour.

Nonpareil, Ross.—Russet, red, roundish, small, table, first-rate; November to February. Fenouillet flavour. An Irish apple.

Nonpareil, Royal.—Greenish red, roundish, middle-sized, table, second-rate; November to January.

Nonpareil, Russet-coated, see Pitmaston Nonpareil Russet.

Nonpareil St. John's.—Yellowish green and brown, ovate, middle-sized, table, second-rate; November to January.

Nonpareil Scarlet (New Scarlet Nonpareil).—Red, roundish, middle-sized, table, first-rate; January to March. Very handsome. Raised in 1773, from an Old Nonpareil seed, sown in a public-house garden at Esher, Surrey.

Nonpareil, Stagg's, see Early Nonpareil.

Nonpareil, Stubton.—Greenish yellow, roundish, small, table, first-rate; January to March. Rich and sugary.

Nonpareil, Sweeny.—Brownish red, roundish, middle-sized, kitchen and table, second-rate; January to

April. Rather acid, but a good bearer. Raised in 1807, by J. N. Parker, Esq., of Sweeny, Shropshire.

Nonpareil, Symonds's. — Green, russet, oblate, middle-sized, table, first-rate; December.

Nonpareil, Taunton.

Nonpareil, Vale Mascal.

Nonpareil, Waterford.

Nonpareil, White.—Pale green, russet, roundish, middle-sized, table, first-rate; December to February.

Nonnette (Rumsche Kruger).

Nonesuch.—Green streaked, oblate, middle-sized, kitchen, first-rate; September. Excellent for apple jelly.

Nonesuch, Bowes's. — Green streaked, roundish, middle-sized, kitchen; October.

Nonesuch, Biggs's.

Nonesuch, Clifton, see Fearn's Pippin.

Nonesuch, Greengrass's.

Nonesuch, Round Winter.—Streaked, round, large, kitchen, first-rate; November to March. Good bearer.

Nonesuch, Hubbardston.

Nonesuch, Royal Winter.

Nonesuch, Watson's New, see Summer Thorle.

Nonesuch Park Apple.—Yellow, roundish, small, table, first-rate; November to February. Resembles the Golden Pippin.

Norfolk Beaufin, see Beaufin.

Norfolk Colman, see Winter Colman.

Norfolk Paradise (Milmount Beaufin). — Red, oblate, middle-sized, kitchen; November to April.

Norfolk Pippin, see Adams's Pearmain.

Norfolk Storing, see Winter Colman.

Norman Knotted.—Streaked, roundish, middle-sized, cider; December to February.

Norman Red.—Yellowish brown and red, ovate, large, cider, first-rate; November. A bitter-sweet.

Norman Styre.—Yellowish red, round, small, cider, October to December.

Norman, Yellow.—Yellow, small, cider.

Normandie, De.—Yellow, roundish, small, cider ; November.

Normandy Pippin. — Yellow and brownish red, roundish, middle-sized, cider.

Normanton Wonder, see Dumelow's Seedling.

North's Crab.—Cider.

Northern Greening (John Apple of some, Cowarn Queensing ditto, Walmer Court).—Green, oval, middle-sized, kitchen, cider, first-rate ; November to April. Keeps sound without shrivelling.

Northwick Pippin, see Blenheim Pippin.

Norton Seedling.

Norwich Jubilee.—Yellow, roundish, middle-sized, kitchen ; November to December. Very acid.

Nostrate Blanche.—Pale green, ovate, large, cider ; December.

Nottidge's Seedling (Nottige's Favourite).

Nottingham.—Yellow, ovate, middle-sized, kitchen, second-rate ; November to January.

De Notre Dame, see Rambour Franc d'Ete.

Nutmeg.

Nutmeg Pippin, see Cockle Pippin.

Oaks.—Streaked, conical, middle-sized, indifferent, November to February.

Æillet.—Cider.

Ognon.—Greenish red, oblate, middle-sized, second-rate ; January.

Oldaker's New, see Alfriston.

Old King.

Old Maids, see Knobby Russet.

Old Park Pippin.—Reddish green, ovate, small, indifferent ; November to January.

Olive Pippin.

Oliver's.—Yellow russet, oblate, middle-sized, table, second-rate ; December to February.

Orange.—Yellow, oblate, middle-sized, kitchen, second-rate ; October.

Orange, American.

Orange, Blenheim, see Blenheim Pippin.

Orange, Isle of Wight, see Isle of Wight Pippin.

Orange Pippin, see Isle of Wight Pippin.

Orack Elma.—Red, oblate, large, table, second-rate ; October. A Persian apple.

Orange Long Laster (Orange Long Yester).

Ord's Apple.—Brown and greenish red, ovate, table, second-rate ; January to May. Brisk juice. Raised by Mrs. Simpson, sister of John Ord, Esq., near Fulham.

Orleans.

Orme.—Pale green, oblate, middle sized, table, second-rate ; February to April.

Ornament de la Table.

Orpolin.

Ortley, see Woolman's Long.

D' Or, Pomme, see Golden Pippin.

D' Or, Pepin, see Golden Pippin.

Orwell Pippin.

Oslin (White Oslin, Arbroath Pippin, Mother Apple, Original).—Pale yellow, roundish, middle-sized, table, first-rate ; August to September. Peculiarly rich aroma. By several of the professional gardeners in the neighbourhood of Edinburgh it is styled the Mother Apple, by others the Golden Apple, and in different parts of England, as well as in the works of some eminent horticulturists, it is denominated the Bur Knot apple. The last of these names is evidently derived from the appearance of the tree, for it in general abounds with a particular sort of burs or knots. The appellation of Oslin is supposed to be derived from its being first brought into Britain from a village of the name of Oslin, in France. The denomination of the Golden apple has, in all probability, been given it from its beautiful

yellow colour. But of all the names by which it has been distinguished, that of "the original" appears to be the most characteristic ; for, from its easy propagation by branches, a bur on them being placed beneath the soil, it may be considered as a mother or original apple. Said to have been raised at Arbroath, in Forfarshire, or introduced by the monks of the Abbey there.

Ostend Pippin.

Ostogotha.

Outre-passe, see *Passe Pomme d'Automne*.

Owen's Golden Beauty, see *White Juneating*.

D'Ozanne.—Cider.

Pasch Apfel, see *Easter Apple*.

Packhorse.—Yellowish red, roundish, middle-sized, table, first-rate ; November to March.

Padley's Pippin (Compote).—Brown and reddish yellow, roundish, middle-sized, table, first-rate ; December to January. Apt to shrivel. Raised in 1811 by Mr. Padley, Royal gardener at Hampton Court.

Painted Lady.—Streaked, roundish, middle-sized, table, second-rate ; October to November.

Pampadura.

Panachee, see *Api Panache*.

Paper.

Paradise.

Paradise (of some), see *Summer Thorle*.

Paradise, White (*Paradise Pippin*, *Egg*, *Lady's Finger*, *Long May*, *May*).—Yellow, oblong, small, table, second-rate ; November to December.

Paradis Franc.—Cider.

Paradis Rouge d'Hiver.—Streaked, ovate, middle-sized, kitchen, second-rate ; November to January.

Paradis, Summer Sweet.

Paradis, Winter Sweet.

Parmentier.—Russet, conical, middle-sized, table, kitchen, first-rate ; November to April.

Parsonag Pippin.—Streaked, oblate, small, table, second-rate ; November.

Passe Pomme.

Passe Pomme d'Automne (Pomme Generale, Outrepasse).—Red, calville-shaped, middle-sized, kitchen, second-rate ; September to October.

Passe Pomme Blanche.—Pale red, calville-shaped, middle-sized, kitchen, second-rate ; September to October.

Passe Pomme du Canada.—Those having the name of *Passe Pomme* are chiefly of the Calville nature, with soft white flesh.

Passe Pomme du Canada Grise, see Royal Russet.

Passe Pomme Rouge.

Passe Pomme Rouge d'Automne.

Passe Rose Plate.

Paternoster.

Paternoster, see Dutch Mignonne.

Paternoster sans Pepins.

Patersonian.

Patriot.

Pawson.—Cider.

Peach Apple.

Peach Apple, Irish (Early Crofton).—Green and brownish red, roundish, middle-sized, table, first-rate ; August to September. An excellent early fruit.

Peach Apple, Oxford, see Scarlet Pearmain.

Pear Apple.—Green, obovate, small, cider, indifferent ; November.

Pearmain, Adam's (Norfolk Pippin).—Yellowish red, pear-shaped, middle-sized, table, first-rate ; November to February. Very handsome.

Pearmain, American, see Royal Pearmain.

Pearmain, see Herefordshire Pearmain.

Pearmain, American Summer.

Pearmain, American Winter Sweet.

Pearmain, Arundel, see Hormead Pearmain.

Pearmain Augustus.—Green streaked, pear-shaped, middle-sized, table, second-rate; November to January.

Pearmain, Autumn (Royal Pearmain of some, Summer Pearmain ditto, American Pearmain).—Yellowish red, pear-shaped, middle-sized, kitchen and table, second-rate; September to October; rich yellow flesh.

Pearmain, Barcelona (Speckled Golden Reinette, Kleiner Casseler Reinette, Reinette Rouge, Reinette Rousse, Reinette de Carmes, Glace Rouge).—Yellowish red, pear-shaped, middle-sized, table, second-rate; November to January. Good bearer.

Pearmain, Baxter's.—Yellowish red, pear-shaped, middle-sized, kitchen and table, second-rate; December to March. A good bearer; scarcely so rich as the Herefordshire Pearmain, which it resembles. A Norfolk apple.

Pearmain, Benwell's.—Middle-sized, oblong, dullish green with red dashes, good, table; Michaelmas to Christmas. Raised by Mr. Benwell, of Henley-on-Thames.

Pearmain, Bernard's. *Pearmain, Blue*.

Pearmain, Bright's (Wick Pearmain).

Pearmain, Capper's.—Streaked, pear-shaped, large, table, second-rate; December to March; handsome.

Pearmain, Chester.—Streaked, oblate, middle-sized, second-rate.

Pearmain, Claygate.—Yellowish red, pear-shaped, middle-sized, table, first-rate; November to March; an excellent dessert apple, having somewhat of Ribston Pippin flavour. Raised at Claygate, near Thames Ditton.

Pearmain, English Winter Gold.

Pearmain, Federal.—Greenish red, pear-shaped, small, table, first-rate; December to March.

Pearmain Foulden (Horrex's Pearmain).—Yellowish red, pear-shaped, middle-sized, kitchen and table, first-rate; November to March. Raised by Mrs. Horrex, of Foulden, Norfolk.

Pearmain, Grange's (Grange's Pippin).—Yellow and greenish red, pear-shaped, large, table, first-rate; November to February. Good bearer.

Pearmain, Golden (Ruckman's Pearmain).—Russet red, oblate, pear-shaped, middle-sized, kitchen, cider, second-rate; November to March.

Pearmain, Hammond's.

Pearmain, Herefordshire (Old Pearmain, Parmain, Royal Pearmain of some, Royal d'Angleterre).—Yellow and greenish red, pear-shaped, large, kitchen and table, first-rate; November to March. An old and very excellent sort.

Pearmain Hormead (Arundel Pearmain, Hormead Pippin).—Yellow, pear-shaped, middle-sized, kitchen and table, first-rate; October to March. A good bearer.

Pearmain, Hubbard's (Golden Vining of some).—Pale russet, pear-shaped, table, first-rate; November to April. Very rich. A Norfolk apple.

Pearmain Gilliflower.—Yellowish red, pear shape, middle-sized, table, second-rate; November to March.

Pearmain, Kilkenny.

Pearmain, Knight's Seedling.

Pearmain, Lamb Abbey.—Green and yellowish red, pear-shaped, middle-sized, table, first-rate; January to April. Keeps well without shrivelling. Raised by Mrs. Malcolm, of Lamb Abbey, Kent.

Pearmain, Large Red Sweet-winter.

Pearmain, Loan's. — Green and yellowish red, roundish, middle-sized, table, first-rate; November to January.

Pearmain, London.

Pearmain, Lord Powlet's.

Pearmain, Mickleham.

Pearmain, Pawson's.—Greenish brown, pear-shape, middle-sized, table, cider, second-rate; December to March.

Pearmain, Parry's. — Pale greenish red, ovate, middle-sized, table, second-rate ; December to March.

Pearmain, Pike. *Pearmain, Royal.*

Pearmain, Royal, see Autumn Pearmain.

Pearmain, Ruckman's, see Golden Pearmain.

Pearmain, Russet Table.

Pearmain, Scarlet (Bell's Scarlet, Oxford Peach).

—Yellow, pear-shaped, middle-sized, table, first-rate ; September to January ; Good bearer.

Pearmain, Spanish.

Pearmain, Striped.

Pearmain, Summer Golden.

Pearmain, Summer.

Pearmain, Sussex Scarlet.—Red, pear-shaped, middle-sized, table ; December to March.

Pearmain, Sweet.

Pearmain, Teraughtie.

Pearmain, Vale Mascall.—Red, ovate, middle-sized, table, first-rate ; December to February.

Pearmain, Vermont Autumn.

Pearmain, Wick.

Pearmain, Winter.—Green and yellowish red, pear-shaped, middle-sized, kitchen and table, second-rate ; December to March ; resembles the Herefordshire Pearmain, but not so rich.

Pearmain, Young's.

Pearson's Plate.—Yellow and greenish red, oblate, small, table, first-rate ; December to March ; handsome, and excellent dessert apple.

Peau de Vache, see Douce Morelle.

Pear Sweeting.

Peckman.

Pelican.

Pencaitland Pippin.

Pennock's Red Winter (Pennock's Large Red Winter, Pennock Red).—Greenish red, oblate, large, kitchen, November to March ; not apt to shrivel.

Pennington Seedling.—Yellow russet, oblate, middle-sized, kitchen and table, first-rate; November to March; an excellent variety.

Pepin Cels.

Pepin Flagelle.

Pepin Knick.

Pepin Kork.

Pepin Noble.—Reddish yellow, roundish, middle-sized, table, second-rate; December to January.

Pepin a Porte.

Pepin Ringler.

Pepin Steuchal.—Streaked, ovate, middle-sized, table, first-rate; November to January.

Peruvian.

Petworth Seedling.—Brownish green, roundish, middle-sized, table, second-rate; November to January.

Petersburgh Pippin, see Newtown Pippin.

Petit Jean.—Red, roundish, small, indifferent; November to March; very abundant bearer; would perhaps do for cider. Native of Isle of Jersey.

Petit Thouars.

Phlamboot.—Red, roundish, large, kitchen, second-rate.

Pigeon (Arabian Apple, Pomme de Jerusalem, Pigeonnet Rouge, Konigliche Taubling).—Pale greenish red, conical, small, table, second-rate; December to January.

Pigeonnet (Pigeonnet Blanc, Pigeonnet Blanc d'Ete, Pigeonnet Gros de Rouen, Cœur de Pigeon, Museau de Lievre, American Peach of some).—Pale greenish red, ovate, small, table, second-rate; August to September.

Pigeonnet Blanc d'Hiver, Mayer's.—Pale yellow, conical, middle-sized, indifferent; December to April.

Pigeonnet Hatif.

Pigeon's Egg.

Pine Apple, Lucombe's (Pine Apple, Pine Apple Pippin).—Yellow, roundish, small, table, first-rate; September to October.

Pine Apple Pippin, Summer.

Pinner Seedling (Carel's Seedling). — Greenish yellow russet, roundish, middle-sized, table, first-rate; December to April. Raised by J. Carrel, nurseryman, of Pinner, Middlesex.

Pitmaston Golden Pippin.—Very like the Pine-apple.

Pitminster Crab.—Streaked, ovate, small, indifferent; November to December.

Plack.

Polnischer Morouki.—Green, roundish, middle-sized; November to February; requires a warm climate.

Pomme Generale, see *Passe Pomme d' Automne*.

Pomme-poire.—Russet, roundish, small, table, first-rate; January to May; not so good as the Old Nonpareil, which it resembles.

Pomme-poire, see Old Nonpareil.

Pomme-poire, Blanche.

Pomme Rose, see *Api Petit*.

Pomme-poire Grosse.

Pomeroy, Early.—Streaked, conical, middle-sized, table, second-rate; October.

Pomeroy, New.—Russet, ovate, middle-sized, table, second-rate; November to December.

Pomeroy, Old (Pomeroy, Taunton). — Brownish yellow, conical, middle-sized, table, first-rate; November to February.

Pompion.

Ponto Pippin.—Brownish red, conical, small, table, second-rate; November to February.

Poor Man's Profit.

Porte Tulipee.—Brownish yellow, oblate, middle-sized, table, second-rate; November.

Porter.

Portugal, see Reinette du Canada.

Post Apfel.—Yellowish red, oval, middle-sized, kitchen, second-rate; November to January.

Post Captain.

Postophe d'Ete.—Red, calville-shaped, small, indifferent; August.

Postophe d'Hiver.—Yellowish red, pear-shaped, middle-sized, kitchen, second-rate; December to January.

Potter's Large, see Kentish Fill Basket.

Prager, see Reinette Grise.

Pound.—Yellow and brownish red, oblong, large, kitchen; November to January.

Pound Sweeting.

Povshon.

Prague.

Priestley (Priestley's American).—Yellowish red, roundish, oblate, large, kitchen and table, second-rate; December to April. Spicy flavour; apt to canker.

Prince's Harvest, see Early Harvest.

Prince.

Prince Royal.—Streaked, oblate, middle-sized, indifferent: December to January.

Prince de Waterloo.

Prince's Pippin.

Princesse Anne.

Princesse Noble Zoete (Princesse).—Pale green, conical, middle-sized, kitchen, indifferent; December. The Princesse Noble apples are all very indifferent in this climate.

Princesse Noble Zoete, see Court-pendu Plat.

Princesse Noble Zuure (Princesse Noble).—Pale yellow, oblong, middle-sized, indifferent; October.

Princesse Victoria, Kirke's.

Prinzen.—Pale yellowish red, oblong, middle-sized, indifferent; October.

Prior's Red.

Profit Apple.—Streaked, conical, middle-sized, kitchen, second-rate ; October to December.

Pursemouth.

Purton's Pippin.

Pupicher.

Quarrenden, Devonshire (Red Quarrenden, Sark Apple).—Red, oblate, middle-sized, table, first-rate ; August ; good bearer.

Quarrenden, Striped, see Early Red Margaret.

Quarrenden White.

Queen's, see Borsdorffer.

Queen Anne.

Queen Charlotte (Queen, Boatswain Pippin).—Greenish red, conical, middle-sized, indifferent. A large sort of Crab.

Queening Cowarn, see Northern Greening.

Queening Crab.

Queening Crab, Knight's.—Cider.

Queening, Crimson (Scarlet Queening, Summer Queening, Red Queening, Herefordshire Queening).—Red, calville-shaped, middle-sized, kitchen, second-rate ; September to November.

Queening, Grey.—Green, russet, oval, middle-sized, table, second-rate ; December to February.

Queening Summer (of some,) see Summer Stibbert.

Queening, Winter (Calville d'Angleterre, Langer Rother Himbeer Apfil).—Red, conical, middle-sized, table and kitchen, second-rate ; December to March. Not so rich as the Cornish Gilliflower.

Quince Apple. *Quoit.*

Rabine.

Rabine d'Ete.

Raboulink.—Red, conical, large, kitchen, second-rate ; November to March.

Raboulink Blanc.—Pale greenish red, roundish, middle-sized, kitchen ; December to January.

Rambo (Romanite, American Seek-no-further).—Yellow, oblate, middle-sized, kitchen, second-rate; December to January.

Rambour (Rambour Franc d'Hiver).—Greenish-red, oblate, large, kitchen; October to January.

Rambour a Cotes Gros, see Calville Blanche d'Hiver.

Rambour Franc (Rambour Gros).—Pale yellowish red, roundish, large, kitchen; Sept. to October. Many varieties are confused under the name of Rambour.

Rambour Frac d'Ete (Rambour Raye, Pomme de Notre Dame).

Rangi.—Red, oblate, middle-sized, kitchen; November to February.

Rangi, Faux.

Rangi, Vrai.

Raspberry.

Rateau, De (Gros Bondy).

Rather Ripe.—Yellow, oblate, small, table, second-rate; August.

Raule's Janet.

Ravelston Pippin.—Yellowish red, roundish, middle-sized, table, second-rate; August.

Rawling's Pippin.

Rawson.

Red Bough.

Red Everlasting.

Red Must.—Cider.

Red Streak, Devonshire. — Streaked, roundish, middle-sized, cider, table; September. Blossoms late.

Red Streak, Dorsetshire.—Streaked, conical, small, cider. A good bearer.

Red Streak, Eaton.—Cider.

Red Streak, Herefordshire (Scudamore's Crab).—Streaked, roundish, middle-sized, first-rate; excellent for cider.

Red Streak, Irish.

Red Streaked, Keeping.—Streaked, roundish, middle-sized, kitchen ; December to April. A handsome firm apple.

Red Streak, Moccas.—Streaked, roundish, small, cider.

Red Streak, Parson's.—Cider.

Red Streak, Scotch Winter.

Red Streak, Winter, see Cumbusnethan Pippin.

Redondelle.—Cider.

Redondelle Nuche.—Yellow, oblate, small, cider ; October.

Red Sweet Pippin (Sweet Pippin of the Americans, Moore's Large Red Winter Sweeting, Large Red Winter Sweeting).—Red, oblate, middle-sized, second-rate ; November to February.

Read's Baker, see Norfolk Beaufin.

Regelans, Pomme, see Cornish Gilliflower.

ReINETTE d' Aix, see Golden Reinette.

ReINETTE d' Aizerna (Reinette d' Breda, Reinette Nelguin, Nelguin).—Brownish yellow, roundish, middle-sized, table, first-rate ; January to March.

ReINETTE d' Astrachan.

ReINETTE Batarde, see Borsdorffer.

ReINETTE Baumann.—Red, oblate, middle-sized, table, second-rate ; December to March. Not apt to shrivel.

ReINETTE de Bentem.

ReINETTE Bernard.

ReINETTE Bischoffs.

ReINETTE Blanche.

ReINETTE Blanche d' Espagne (Reinette d' Espagne, D'Espagne, Fall Pippin, Cobbet's Fall Pippin).—Pale greenish red, roundish, large, kitchen and table, first-rate ; November to March. One of the largest sized apples. Trees subject to canker.

ReINETTE Borsdorffer, see Borsdoffer.

ReINETTE Bosc.

Reinette, Brame.

Reinette de Bretagne.

Reinette Brodee, see Embroidered Pippin.

Reinette, Calville.

Reinette du Canada (*Reinette du Canada Blanche*, *Reinette Grosse du Canada*, *Du Canada*, *Reinette du Caen*, *Reinette du Canada a Cotes*, *Portugal*, *Wahre Reinette*, *Reinette Gros d'Angleterre*, *De Bretagne*, *Janurea*, *St. Helena Russet*).—Brown and yellowish green, flat conical, large, kitchen and table, first-rate; November to April. Good bearer. Is probably the best apple of its size, and surpassed by few of those that are smaller: it therefore deserves extensive cultivation.

Reinette du Canada Grise, see Royal Russet.

Reinette du Canada Platte, see Royal Russet.

Reinette des Carmes, see Barcelona Pearmain.

Reinette Caractere.—Yellow, russet, oval, small, table, first-rate; December to April. Peculiar sub-acid, and slight Fenouillet flavour.

Red Streak (of Backhouse), see Flower of the Town.

Reinette, Carse.

Reinette du Caux.

Reinette, Chassens Glanz.

Reinette, Citronen.

Reinette d'Angleterre, see Golden Pippin.

Reinette Von Claveral.

Reinette, Contin.—Yellowish red, roundish, middle-sized, table, second-rate; October. A good bearer. Raised by Sir G. I. Mackenzie, at Coul, N.B.

Reinette, Course.

Reinette, Crudos Gutten.

Reinette Diel.—Yellowish red, oblate, middle-sized, table, first-rate; December to March.

Reinette, Dietzer Mandels.

Reinette Doree (of the Germans), see Dutch Mignonne.

Reinette Doree (of the French), (*Reinette Jaune Tardive*, *Reinette Rousse*).—Different sorts have fruited under this name, but none of them are equal to the Golden Reinette or Dutch Mignonne.

Reinette de Doue.

Reinette Drapier.

Reinette, Early French, see Early Harvest.

Reinette, Englische Granat.

Reinette, Episcopale.

Reinette, d'Erkenstein.—Yellowish brown, roundish, middle-sized, second-rate; November to January.

Reinette, d'Espagne, see *Reinette Blanche d'Espagne*.

Reinette Franche.

Reineete Franche a Cotes.

Reinette Franche Grauwe.—Brown russet, roundish, middle-sized, kitchen and table, first-rate; December to April. Requires a good situation, with free admission of sun.

Reinette, French, see French Russet.

Reinette, Gardanker Gold.

Reinette, Guamont.

Reinette, Gielen, see Golden Reinette.

Reinette de Geer.

Reinette Gielen, Grosse.

Reinette, Glanz.

Reinette, Golden (Kirke's Golden Reinette, Yellow German Reinette, English Pippin, Aurore, Reinette d'Aix, Court-pendu Dore, Elizabet, Princesse Noble of the French, Reinette Gielen, Wyker Pippin, Wygers, Megginch Favourite, Dundee).—Reddish yellow, oblate, middle-sized, table, first-rate; October to January. A handsome, regularly formed, and excellent dessert fruit. Good bearer. Originally raised in Hertfordshire, where it is still a common apple.

Reinette, Goldgelbe Sommer.—Yellow, oval, middle-sized, second-rate; September.

Reinette Græm.

Reinette Grise (Reinette Gris Extra, Belle Fille, Roger).—Yellow russet, oblate, middle-sized, table, first-rate; November to March.

Reinette Grise d'Angleterre Petit.—Russet, oblate, small, table, first-rate; November to January.

Reinette Grise de Champagne.—Russet, roundish, small, table, second-rate; November to March. Flavour resembles that of Fenouillet Gris.

*Reinette Grise Doree.**Reinette Grise Double.*

Reinette Grise de Grandville.—Yellow russet, oblate, middle-sized, table, second-rate; December to February.

Reinette Grise d'Hiver Petit.

Reinette Grise de Holland (Reinette de Havre, Reinette de Hongrie).—Russet, roundish, small, table, second-rate; November to March. Very thickly coated with russet.

Reinette Grise de Metz.—Russet, roundish, small, table, second-rate; November to March.

Reinette Grise, New.—Yellow russet, oblate, small, table, first-rate; January to March. Good bearer.

Reinette Grise de St. Onge.

Reinette Grise de Turbinee.—Russet, oblate, small, table, first-rate; December to January. Tree subject to canker.

Reinette Grosse du Canada, see Reinette du Canada.

Reinette Gros d'Angleterre, see Reinette du Canada.

Reinette Grosse d'Angleterre (Pomme Madame of some).—Streaked, roundish, large, kitchen and table, second-rate; December to February. Nearly as large as the R. du Canada, but of less merit.

Reinette, Grove End.

Reinette Grune, see Old Nonpareil.

Reinette de Hollande.

Reinette de Hongrie, see *Reinette Grise de Hollande*.

Reinette Jaune Hative (Drap d'Or of some, *Reinette Grise de Automne* of some, *Reinette Marbree* of some, *Citron des Carmes*).—Yellow russet, roundish, middle-sized, table, second-rate ; November.

Reinette Jaune Sucree (*Citron*, *Anglaise*, *Chance*).—Yellow, oblate, small, table, first-rate ; November to February. Tree apt to canker.

Reinette Kaul.

Reinette Konigs.—Yellowish red, oblate, middle-sized, table, second-rate ; December to February.

Reinette, Kirke's Golden, see *Golden Reinette*.

Reinette, Kleiner Casseler, see *Barcelona Pearmain*.

Reinette, Knack.

Reinette de Laak.—Yellowish red, roundish, middle-sized, table, second-rate ; September. A good bearer.

Reinette, Lancashire.

Reinette, Large Sweet.

Reinette a Longue Queue.

Reinette Marbree, see *Reinette Jaune Hative*.

Reinette Micheaux.—Yellow, oblate, middle-sized, table, second-rate ; December.

Reinette Minster Golden.

Reinette Mononisten.

Reinette de Monthron.—Yellow, roundish, middle-sized, table, second-rate ; October to November.

Reinette Mulchompts Carmine.—Yellowish red, roundish, middle-sized, table, second-rate ; October to November.

Reinette, Muscaten.

Reinette de Meseau.

Reinette Musquee.

Reinette Nonpareil, see *Old Nonpareil*.

Reinette Naine.—Yellowish green, conical, middle-

sized, table, second-rate; November to February.
Tree dwarf.

Reinette Neimans Rother.—Yellowish red, conical, middle-sized, table, second-rate; December to February.

Reinette du Nord.—Yellow, oval, middle-sized, table, second-rate; will keep two years.

Reinette, Northern.

Reinette Von Orleans.

Reinette Paille.

Reinette, Pepin de.

Reinette, Pictee.—Pale russet, roundish, middle-sized, kitchen, indifferent; October.

Reinette Nelguin, see *Reinette d'Aizerna*.

Reinette, Phillips's, see *Court of Wick*.

Reinette, Platte.

Reinette, Poiré.

Reinette de Provence.

Reinette Quetten (Quince *Reinette*). — Yellow, obovate, middle-sized, kitchen, second-rate; October to February. Shaped like a quince.

Reinette Rouge, see *Barcelona Pearmain*.

Reinette de Rochelle.

Reinette Rouge Pictee.

Reinette Rouge de Pentecote.

Reinette Rouge de Sickler.

Reinette Rousse, see *Barcelona Pearmain*.

Reinette Royal.—Streaked, conical, large, kitchen and table, second-rate; December to April; good bearer.

Reinette Saffran.—Yellow, russet, conical, middle-sized, cider, second-rate; August to September.

Reinette, Selwood's.—Greenish yellow, pear-shaped, small, table, second-rate; December to February.

Reinette, Speckled Golden, see *Barcelona Pearmain*.

Reinette Striped Monstrous.—Streaked, roundish, large, kitchen, second-rate; November to December.

Reinette Truite.—Yellow streaked, roundish, middle-sized, table, second-rate; November to December. Sugary but not very juicy.

Reinette, Tyroler Glans.—Pale yellow, roundish, middle-sized, table, second-rate; December to January.

Reinette, Wellners Gold.—Russet, oval, small, table, first-rate; January to May; handsome and rich.

Reinette Wahre, see *Reinette du Canada*.

Reinette, Weise Antillischere.

Reinette Van Mons.

Reinette Verte.—Green, roundish, small, table, first-rate; December to May; partakes of the flavour of Golden Pippin and Nonpareil.

Reinette, Yellow German, see *Golden Reinette*.

Reinette Zorgoliet.

Reinette, Zimt.

Reinette, Zoete Grauwe.

Reinivardt.

Renquevelet.—Cider.

Renshaw's Beauty.

Rhein Apfel, der Saure.—Cider; November to April.

Rhinebeck Pippin.

Rhode Island Greening.—Green, roundish, large, kitchen and table, first-rate; December to April; good bearer.

Ribston Pippin (Glory of York, Formosa Pippin, Travers's).—Green and yellowish red, roundish, middle-sized, table and kitchen, first-rate; November to March; ought to be in every collection; trees very healthy in some soils; in others subject to canker. Raised at Ribston Hall, near Knaresborough, from French seed.

Ribston Pippin, New.

Rick.

Ridge.

Riviere.

Roan's White Crab.—Yellow, roundish, small, cider; January to March.

Rigby's Pippin.—Pale yellowish red, roundish, middle-sized; December to February.

Robert's Seedling.

Robinson's Pippin.—Russet, roundish, small, table, first-rate; December to February.

Rob Roy.—Yellow and greenish red, roundish, middle-sized, kitchen, second-rate.

Rockrimmon.

Rodmersham Pippin.—Yellowish red, roundish, middle-sized; kitchen, second-rate; October to December.

Rogers's Magnum Bonum.

Roi, Du.

Roi Tres Noble, see *Edel Konig.*

Romaine.—Yellow, roundish, middle-sized, table, first-rate; September.

Romaine Blanche.—Pale yellow, oblong, middle-sized, indifferent; November to February; requires a warmer climate than that of Britain.

Romaine d' Italie.

Roman Stem.—Yellow and brownish red, ovate, small, table, second-rate; November to December.

Romanite, see *Rambo.*

Romril.—Pale yellow, oblate, middle-sized, kitchen, cider, first-rate; November to February; great bearer.

Rosackerle (*Pomme de Hanau*).—Yellowish red, roundish, middle-sized, cider; January to March; a bitter-sweet.

Rose de China.—Green and yellowish red, roundish, middle-sized, table, first-rate; November to February.

Rose Harding.

Rook's Nest Apple, see Spice Apple.

Rosmarinapfel, Weisser Italienische.

Rostocker (Stetting Rouge.)—Red, oblate, large, kitchen, first-rate; November to May; resembles Norfolk Beaufin.

Rother Bietigheimer.—Streaked, roundish, large, kitchen; November to February.

Rother Wiener Sommer Apfel.—Yellowish red, pear-shaped, middle-sized, table, second-rate; October.

Rouge Bruyere.—Cider.

Rouge de Pentecote.—Red, calville-shaped, middle-sized, kitchen; January to April.

Rougham Seedling.—Greenish red, oblate, small, table, second-rate; December.

Round.

Round Head.—Green, roundish, middle-sized, kitchen; November to January.

Rowlinson's.

Royal Beacham.—Cider.

Royal Devon.—Pale yellow, streaked, roundish, small, cider; November to December; bitter.

Royal George.

Royal Jersey.—Streaked, roundish, small, cider.

Royal Mundi.

Royal Pippin.

Royal Red, Hunt's.

Royal Somerset, see London Pippin.

Royal Wilding.—Yellow, conical, small, cider, first-rate; December. A shy bearer, from Herefordshire, but one of this name in Devonshire has been much celebrated.

Royale d'Angleterre, see Herefordshire Pearmain.

Royal Rouge d'Hiver.

Rumsche Kruger, see Nonnette.

Ruby, Winter.—Red, roundish, middle-sized, indifferent; December to February; bright colour.

Russet's.

Russet, Acklam's.—Below middle size, round and flat; yellowish green and russet, good, table; November to February. A Yorkshire apple.

Russet, Aromatic, see Spice Apple.

Russet, Bath.

Russet, Bishop's.

Russet, Bowyer's (Bowyer's Golden Pippin.)—Yellow russet, roundish, oval, small, table, first-rate; September; shoots canker.

Russet, Boston (Roxbury Russet, Shippen's Russet of some).—Russet, roundish, middle-sized, table, first-rate; January to April. Of excellent quality, with a Ribston Pippin flavour.

Russet, Bowne's Imperial.

Russet, Burgundy.

Russet, Byson Wood, see Byson Wood.

Russet, Caraway.

Russet, French (French Reinette, French Pippin).—Russet, roundish, middle-sized, kitchen; November to December.

Russet, Golden (Golden Mundi of some).—Russet, ovate, middle-sized, table and kitchen; first-rate; December to March. Requires a good situation.

Russet, Harvey.

Russet, Irish, see Sam Young.

Russet, Knobby (Winter, Old Maids).—Russet, oval, small, table, first-rate; December to March. Surface thickly coated with russet and remarkably uneven.

Russet, Mignonne.

Russet, Morris's Nonpareil.—Russet, oblate, small, table, first-rate; November to February.

Russet, More's.

Russet, Pitmaston Nonpareil (Russet-coated Nonpareil).—Russet, oblate, small, table, first-rate; December to February. Not handsome, but exceedingly rich and brisk flavoured.

Russet, Nine Partners Little.—Green russet, oval, small, table, first-rate; January to May.

Russet, Orange.

Russet, Patch's.—Russet, oval, small, table, second-rate; November to December.

Russet, Pile's.

Russet, Plough Keepsie.

Russet, Powell's.—Russet, roundish, small, table, first-rate; November to February.

Russet, Rawlin's Fine Red Streak.

Russet, Roxberry, see Boston Russet.

Russet, Royal (Passe Pomme du Canada, Reinette du Canada Grise, Reinette du Canada Platte, Leather-coat).—Russet, conical, large, kitchen, first-rate; November to May. Becomes soft unless kept in pure sand; tree bears well.

Russet, St. Helena, see Reinette du Canada.

Russet, Sandy's.—Russet, oblate, small, table, second-rate; November to February.

Russet, Scarlet.

Russet, Scotch.

Russet, Skippen's.

Russet, ditto, see Boston Russet.

Russet, Sison's.

Russet, Sweet.—Red russet, roundish, small, table, second-rate; November to December.

Russet, Sweeting.—Russet, roundish, middle-sized, kitchen; January to March.

Russet, Swinden's Table.

Russet, Syke House (Syke House).—Russet, oblate, small, table, first-rate; November to February. Particularly deserving of cultivation. Raised at Syke House, in Yorkshire.

Russet, Wareham's.

Russet, Wheeler's.—Green russet, oblate, middle-sized, kitchen and table, first-rate; November to April.

Russet, White.—An Irish apple. Large, angular, yellow, white and russet, table, good; November and December.

Russeting, Cooper's.

Russeting, Long Island.

Russeting, Mr. Keen's Small.

Russeting, White.

Russeting Winter.

Russian.

Russian, see Court-pendu Plat and Summer Gilliflower.

Russian Emperor, see Alexander.

Russian Transparent.

Rymer (Caldwell, Green Cossings, Newbold's Duke of York, Newbold's Admiral Duncan).—Pale greenish red, roundish, large, kitchen, first-rate; December to April. Keeps very firm, and contains a brisk sharp juice. Raised by Mr. Rymer, of Thirsk, Yorkshire.

Sabine (of the French).

Sabine (of the Fleming's), see Gravenstein.

Sack.

Sack, Herefordshire.

Sack Apple, see Devonshire Quarrenden.

Sack-and-Sugar.—Yellow, roundish, small, kitchen and table, second-rate; August; good bearer.

Sacomb, Flemish.

Saint Andrew.

Saint Germain.

De Saint Julien (Seigneur d'Orsay).—Greenish-yellow, roundish, large, table, first-rate; December to March. Bears well.

Saint Laurance.—Yellow, oblate, small, table, second-rate; August to September; cankers.

Saint Mary's Pippin, see Downton.

De Saint Louis.

Saint Martinzœable.

Saint Michael's Pippin.

De Saint Nover.—Cider.

Saint Patrick's Sweeting.—Yellow, oblate, small, table, indifferent ; August to September.

Salopian.—Pale green, oblate, middle-sized, kitchen, first-rate ; October to December. Good bearer.

Sam's Crab, see Longville's Kernel.

Sam Rawling's, see Hoary Morning.

Sam Young (Irish Russet).—Russet, oblate, small, table, first-rate ; November to February. Rich and high flavoured. An Irish apple.

Sanguineum, see de Neige.

Sang Tardif.

Sapling Bark.—Yellow, oval, small, indifferent ; August.

Saru Sinap.

De Sauge.—Yellow, brownish red, oblate, middle-sized, cider ; November to February. A bitter-sweet.

Scarlet Admirable, *Kirke's*, see Hollandbury.

Scarlet Perfume, see Cole.

Savelow's.

Scarlet Weeper.—Streaked, conical, middle-sized, table, indifferent ; November to December.

Schafer.—Greenish red, roundish, small, table, second-rate ; December to January. Resembles the Scarlet Nonpareil.

Schweitzer Schlotter Apfel.

Scudamore's Crab, see Herefordshire Red Streak.

Sea Cliff.—Green, oblong, large, kitchen, second-rate ; October to January.

Schiebich.

Schyers, *Pippin*.

Sedan.

Sedgefield.—Streaked, round, middle-sized, second-rate ; December to February.

Seek-no-further, see Yorkshire Greening.

Seek-no-further, *American*, see Rumbo.

Seaside Lemon.

Seigneur d'Orsay, see Saint Julien.

De Seigneur Rouge, see d'Adam.

Du Scrail.

Shaw Green.

Shepherd's Fame.—Like Blenheim Pippin.

Shepherd's Newington.—Streaked, roundish, large, kitchen; October to November. Does not keep well.

Sheep's Nose (Bullock's Pippin, Long Tom.)

Shireling, see Lancashire Gap.

Shorrocks Table Fruit.

Shustoke Pippin.—Yellowish red, oblate, middle-sized, kitchen, indifferent; December.

Siberian Harvey.

Siberian Sugar.—Yellow, roundish, small, cider, first-rate; December to January. Flesh orange, juice highly saccharine.

Siben Schlafer.—Pale yellow, oblong, middle-sized, indifferent; November to January.

Silverling.—Pale green, conical, large, kitchen; November to March.

Simpkin.

Simpson's Seedling.—Green, ovate, middle-sized, table, second-rate; January to April.

Sine-qua-non.

Sir Thomas Gower's.

Sir Walter Blacket's Favourite, see Edinburgh Cluster.

Sir William Giblon's.

Sir William Parker's.—Like a Golden Pippin.

Sklenkory.

Slade's Pippin.—Pale brownish red, ovate, small, table, second-rate.

Solebury Cider, see Buk's County.

Somerset Lasting.—Pale yellowish red, oblate, large, kitchen; October to February.

Sommer Kleiner.

Sommer Koning.

Sonnette.—Greenish yellow, ovate, middle-sized, cider. A bitter-sweet.

South Carolina Pippin.—Yellow, roundish, large, kitchen ; December.

Sour Rawlings.

Sovereign.—Yellow, pear-shaped, middle-sized, indifferent ; October.

Sparrow Pippin.

Spatblukende (Moetapfel a Fleurs Tardives).—Streaked, oblong, middle-sized, kitchen ; November to December.

Spice Apple (Aromatic Russet, Brown Apple of Burnt Island, Rook's Nest Apple, Brown Spice, Burnt Island Pippin).—Russet, conical, middle-sized, table, second-rate ; October. Good bearer.

Spice, Early.

Spice, Scarlet.

Spice, Sweeting.

Spicewood.

Spiesslinger.

Spitzemberg Cesopus (Spitzemberg Flushing).—Red, oblong, middle-sized, kitchen and table, first-rate ; requires a south wall ; November to January. An American apple.

Spitzemberg, Kaigns.—Pale red, conical, middle-sized, indifferent ; November to January.

Spitzemberg, Newtown (Matchless).—Yellowish red, roundish, middle-sized, kitchen and table, second-rate ; November to February. Very handsome. An American apple, introduced by Mr. Cobbett.

Spitzemberg, Pownal's.

Spitzemberg, White.

Spotted Pippin.

Standard.

Staunton Pippin.

Stead's Kernel.—Cider.

Stern Apfel.

Stettin Pippin, see Dutch Mignonne.

Stettin Jaune.—Yellow, roundish, large, kitchen ; January to June. Bears abundantly.

Stettin Rouge, see Rostocker.

Stelsted Pippin.

Stetchworth Seedling, Bayley's.

Stetchworth Seedling, Eaton's.

Stire.

Stire, Red.—Streaked, roundish, small, cider, first-rate ; November to January. Austere.

Stire, White.—Pale green, roundish, small, cider, first-rate.

Stirling Castle.

Stoke Park Pippin.—Very like the Pine-apple.

Stone Pippin.—Pale yellow, oblate, middle-sized, table, first-rate ; January to April. Handsome.

Stone Pippin, Norfolk (White Stone Pippin, White Pippin, Winter Stone Pippin).—Pale greenish yellow, oblong, middle-sized, kitchen, table, second-rate ; November to July. Valuable for its long keeping. A Norfolk apple.

Stone Pippin, see Gogar Pippin.

Stony Royd Pippin.—Yellow, roundish, middle-sized, kitchen and table, first-rate ; January to April.

Straat.—Greenish yellow, roundish, middle-sized, table, first-rate ; December to April. Resembling Newtown Pippin. Tree disposed to canker.

Strawberry, Early.

Strawberry, Summer.

Strawberry, Winter.

Strode House Pippin.—Yellow, roundish, middle-sized, table, second-rate : November.

Strifling d' Hiver, see D' Astem.

Striped Holland Pippin, see Lincolnshire Holland Pippin.

Striped June.

Stubton Pippin.

Sturmer Pippin.——Greenish yellow and brown, conical, middle-sized, kitchen and table, first-rate; February to June. Brisk flavour.

Stuttgarter Gaishirtel, see Wugsdorffer.

Sudbury Beauty.—Yellow, roundish, small, table, first-rate; October to January.

Sugar, Siberian.

Sugarloaf Pippin (Hutching's Seedling, Dolgoi Squozni—Long transparent).—Green, oblong, middle-sized, kitchen; August. A Russian apple, from the Taurida Gardens.

Summer Hedging.—Red, roundish, small, cider.

Summer Pippin, see Margaret and Summer Golden Pippin.

Summer Queen.—Pale yellowish red, roundish, middle-sized, kitchen, second-rate; August to September.

Summer Rose.—Yellowish red, oblate, small, kitchen and table, second-rate; August.

Summer Stibbert (Summer Queening of some, Avant Tout, Hative).—Yellow, conical, large, kitchen, second-rate; August. Good bearer.

Summer Traveller, see Early Red Margaret.

Superieure.

Superintendenten.

Superintendent Prachtvoll Reinette.

Surprise.

Sussex.—Pale greenish red, oblate, middle-sized, table, second-rate; November.

Svinels. *Swaar*.

Swedish Early Sauce.—Streaked, conical, middle-sized, kitchen, second-rate; August.

Swedish Golden.

Sweet Lading.—Streaked, oblate, middle-sized, cider, second-rate; November.

Sweet Little Wilding (Zoete Wildjes). — Small, cider.

Sweet Pippin (of the Americans), see Red Sweet Pippin.

Sweeting, Large Green.

Sweeting, Large Red Winter, see Red Sweet Pippin.

Sweet Pippin.—Yellow, ovate, small, cider; October to November.

Sweet Topaz.

Sweeting, Large Striped.

Syke House, see Syke House Russet.

Taffitai, see Transparent d'Astrachan.

Tankard, Old.

Tankerton.

Tankerville.—Streaked, roundish, small, indifferent; September.

Tanner's.

Tardfleur.—Cider.

Taunton, se Pomeroy.

Tay Side Pippin.

Ten Shillings.—Russet, red, oblate, middle-sized, table, second-rate; November.

Tenterden Park.—Yellowish red, roundish, small, table, first-rate; October to February.

Terwin's Goliath.

Tete du Chat.

Tete du Chat (of Jersey), see Round Catshead.

Tetofsky.—Streaked, oblong, middle-sized, table, second-rate; August to September. Handsome.

Tewksbury, Winter Blush.

Thickset, see Cluster Golden Pippin.

Thompson's.

Thorle, Summer (Whorle Pippin, Watson's New Nonesuch, Paradise of some).—Pale yellowish red, oblate, middle-sized, table, first-rate; August to September. A very handsome apple.

Thorle, Winter.

Toilet, see De Longbois.

Thoresby Seedling.—Red, pear-shaped, middle-sized, table ; January to April.

Tockington Ruby.—Cider.

Tom Potter.

Tom Put. *Top.*

Tonnelle.

Tontigne.

Torbron's.

Tower of Glammis (Glammis Castle, Late Carse of Gowrie).—Greenish yellow, conical, large, kitchen, first-rate ; November to January.

Transparent, see *De Glace*.

Transparent d' Astrachan (Taffitai).

Transparent d' Christ.

Transparent Green.

Transparent, Wood's New, see *Court of Wick*.

Transparent de Moscovie, see *White Astrachan*.

Transparent de Zurich.—Pale yellow, conical, middle-sized, cider ; September to October. Good bearer.

Traveller.—Streaked, oblate, middle-sized, table, indifferent.

Travers's, see *Ribston Pippin*.

Travelling Queen.—Streaked, roundish, middle-sized, indifferent ; November to January.

Trianon Superbe.

Troughton's.

Trinnpington (Eve Apple, Delaware).—Red, oblate, small, table, second-rate ; September to December.

Tschelebi.

Turk's Cap.—Cider.

Turc Vert.

Tulip (Tulp, Tulpen).—Red, ovate, middle-sized, table, second-rate ; November to April. A Dutch apple of a very bright red colour, and a good bearer.

Turpin.—Yellow, ovate, middle-sized, kitchen ; November to May.

Turin Cluster Pippin, see *Cluster Golden Pippin*.

Turckenham.—Streaked, broad, conical, large, kitchen ; September to October.

Two Yearling.—Yellow, roundish, small, table, second-rate ; May to July.

Uffington Pippin.

Underleaf.—Yellowish red, oblate, middle-sized, second-rate ; December.

Underleaf, Herefordshire.

Valentine.

Valleyfield Pippin.—Greenish red, oblate, middle-sized, table, second-rate ; September. Good bearer.

Vandervere.—Yellowish red, oblate, middle-sized, kitchen and cider, second-rate ; December to March.

Van Dyne, see Woolman's Long.

Vater Apfel ohne Kerne.

Veiny Pippin.—Brownish green, roundish, middle-sized, indifferent ; October to January. Great bearer.

Venus Pippin.

Verte Mure.

Vertue.

Violette, Pomme (*Violette de Quartre Gouts, Gros Pomme Noire d'Amerique, Red Calville* of some).—Dark red, conical, large, kitchen, second-rate ; October to March. Moderate bearer, fruit covered with bloom like a plum.

Virginia Favourite.

Wach's Apfel.—Pale yellow, oblong, middle-sized, cider ; October to December.

Wadhurst Pippin (*Walmer Court*, see Northern Greening).—Yellow and brownish red, roundish, large, kitchen, first-rate ; October to February.

Waltham Pippin.

Waltham Abbey Seedling (*Docter Harvey* of some).—Yellow, roundish, large, kitchen, first-rate ; September to January. Fruit handsome. Requires but little sugar ; tree a good bearer. Raised in 1810 from a seed of the Golden Noble, by Mr. Barnard, of Waltham Abbey.

Wanderer.

Warren.

Warwickshire Greening.

Warwickshire Pippin, see Wyken Pippin.

Wasserlinger.—Greenish yellow, streaked, roundish, large, cider ; September to April.

Watch Apple, see Cambusnethan Pippin.

Watson's Dumpling—Streaked, roundish, large, kitchen, first-rate ; October to February.

Wax.

Weisbrod.

Weisser Bietigheimer.

Weeks Pippin, see Court of Wick.

Wellbank's Constant Bearer.—Yellowish red, roundish, ovate, middle-sized, kitchen, second-rate ; November to January.

Wellington, see Dumelow's Seedling.

Welsh Pippin.—Yellow, calville-shaped, middle-sized, kitchen ; November to January.

West Grinstead Pippin.—Green streaked, roundish, middle-sized, table, second-rate ; November to April ; does not shrivel.

Wetherell's White Sweeting.—Yellow, roundish, middle-sized, cider ; September ; a sweet cider apple.

Whernel's Pippin.—Yellow, pear-shaped, middle-sized, kitchen, second-rate ; December to March.

White Costin.

White Easter.—Pale yellow, pear-shaped, middle-sized, kitchen ; January to April.

White Hyde Pippin.

White Loaf.—Yellowish red, oblate, large, kitchen.

White Letham Pippin.

White Lily, see Devonshire Buckland.

White Pippin, see Norfolk Stone Pippin.

White Seal.—Pale yellow, oblong, large, kitchen ; September ; of little value.

White Sour, see Devonshire White Sour.

Whitmore Pippin.—Yellow, conical, large, kitchen, second-rate ; December to January.

Whorle Pippin, see *Summer Thorle*.

William.—Yellow, oblate, middle-sized, table, cider, second-rate ; November to January.

Winchester.

Williams's Favourite.

Williams's Pippin.

William, Prince.

Windham's Pippin.

Windham's Seedling.—Yellow, oblate, middle-sized, kitchen, indifferent ; November to March.

Wine.—Yellow, oblate, middle-sized, cider ; December.

Wine, Green.

Wine, Red.

Wine, Vandervoust's White.

Wine, White.

Wine, Sops of.—Red, roundish, middle-sized, cider ; October to February.

Wine Sop, Winter.

Wine Sop, American.—Red, roundish, middle-sized, kitchen, second-rate ; December to April.

Wine, Spitzemberg.

Winter, see *Knobby Russet*.

Winter Bogge, Zoete.

Winter Colman (Norfolk Colman, Norfolk Storing).—Yellowish red, roundish, middle-sized, kitchen, first-rate ; November to April. A Norfolk apple.

Winter Greening.

Winter Majetin.—Green and brownish red, roundish, large, kitchen, first-rate ; January to May ; tree hardy, not subject to the attacks of insects. A Norfolk apple.

Winter Pippin.

Winter Scarlet.—Red, calville-shaped, middle-sized, kitchen ; November to January.

Winter Stone Pippin, see *Norfolk Stone Pippin*.

Winter Warden.—Streaked russet, roundish, middle-sized, kitchen, second-rate; December to February.

Wire Wood.

Wise Apple.

Witham's Pippin.

Witte Wyn.—Pale green, roundish, middle-sized, cider; October to November.

Woodcock, see *Northern Greening*.

Woodcock, New.—Streaked, roundish, middle-sized, cider; December to January.

Wood's Hundington, see *Court of Wick*.

Woodstock Pippin, see *Blenheim Pippin*.

Wood's Greening.—Green, conical, middle-sized, kitchen and table, second-rate; January to May.

Woolman's Long (Ortley, Van Dyne).—Yellow, oblong, middle-sized, kitchen and table, first-rate; December to April; excellent in a good situation. From New Jersey, in N. America.

Wollaton Pippin, see *Court-pendu Plat*.

Wormsley Pippin (Knight's Codlin).—Pale green, roundish, middle-sized, kitchen and table, first-rate; September to October. Raised by Mr. Knight, at Wormsley Grange.

Wugsdorffer (Stuttgarter Gaishirtel).

Wydoge.—Yellowish red, conical, middle-sized; second-rate.

Wyken Pippin (Warwickshire Pippin, Girkin Pippin, Arley).—Yellow, oblate, small, table, second-rate; December to April; has been confused with Wyker Pippin, but is very different. Raised at Wyken, near Coventry, by a Lord Craven. A great favourite in Warwickshire.

Wyker Pippin, see *Golden Reinette*.

Wygers, see *Golden Reinette*.

Yellow, see *Court of Wick*.

Yellow Bough, Large Early.—Yellow, roundish, large, kitchen, first-rate ; August to September.

Yellow Harvest, see Early Harvest.

Yellow Harvest, Large.

Yellow Pippin.

Yellow Seggiden,

Young Pippin.

Young's Seedling.—Greenish red, roundish, middle-sized, kitchen and table, second-rate ; January to June.

Yorkshire Greening (Coates's, Seek-no-further of some, Yorkshire Goose Sauce).—Green, oblate, large, kitchen, first-rate ; October to January ; apt to speck, yet much esteemed for kitchen use.

Yorkshire Greening, Woolaton.

Zoete Blanke.—Yellow, calville-shaped, small, cider, second-rate ; October to March.

Zoete Champagne.—Russet, roundish, small, cider, second-rate ; November to January ; a sweet russet.

Zoete Kandy.—Yellowish red, roundish, middle-sized, second-rate ; December to January.

Zoete Kantjis.

Zoete Jopen Roode.

Zoete Peter Lely.—Russet, oblate, small, table, first-rate ; November to February.

Zoete Wildjes, see Sweet Little Wilding.

Zoete Raboise.

Zoete Vene.

Zuribel.

APPLES USED AS STOCKS.

English Paradise.

French Paradise.

Doucin (of the French).

Wild Crab.

SELECTION OF APPLES FOR THE CLIMATE OF LONDON.

Dessert Sorts.

Early Red Margaret	..	ripens in August.
Devonshire Quarrenden	..	Aug. and Sept.
Oslin	..	Aug. and Sept.
Summer Golden Pippin	..	Aug. and Sept.
Kerry Pippin	..	Sept. and Oct.
Wormsley Pippin	..	Sept. and Oct.
King of the Pippins	..	Oct. and Jan.
Hughes's Golden Pippin	..	Dec. and Feb.
Pearson's Plate	..	Dec. and Mar.
Ribston Pippin	..	Nov. and Mar.
Downton Nonpareil	..	Dec. April, or May.

EDINBURGH AND DUBLIN.

In situations where the Ribston Pippin is known to canker, the Herefordshire Pearmain may be substituted; and, with this alteration, the above selection is presumed to be suitable for the climates of Edinburgh and Dublin. For additional choice and trial, the following are highly deserving of notice as dessert apples of approved excellence :—

Large Golden Bough, or Early Harvest,	ripens in the beginning of August.
Golden Reinette Oct. and Jan.
Golden Harvey Dec. and May
Scarlet Nonpareil Jan. and March
Braddick's Nonpareil Jan. and April.
Old Nonpareil Jan. and May.

KITCHEN APPLES SUITED FOR THE GENERAL CLIMATE OF BRITAIN.

From the following sorts of kitchen apples, suit-

able for the general climate of Britain, a supply may be obtained throughout the year :—

Hawthornden	Alfreton.
Blenheim Pippin	Brabant.
Bedfordshire Foundling	Northern Greening

FOR THE NORTH OF SCOTLAND.

Dessert.—Oslin, Early Red Margaret, Pitmaston Nonpareil, Wormsley Pippin, Ribston Pippin, Baxter's Pearmain, Court of Wick, Claygate Pearmain, Pearson's Plate, Braddick's Nonpareil, Scarlet Nonpareil, Sturmer Pippin.

For Kitchen use.—Dumelow's Seedling, Tower of Glammis, Keswick Codlin, Hawthornden, Bedfordshire Foundling, Round Winter Nonesuch, Mere de Menage, Northern Greening, Royal Russet, Waltham Abbey Seedling, Yorkshire Greening, Rymer.

FOR WALLS.—Golden Pippin, Golden Harvey, Ribston Pippin, and Nonpareil.

FOR ESPALIERS AND DWARF STANDARDS, the same as for Walls, together with King of the Pippins, Newtown Pippin, Court of Wick, Scarlet Nonpareil, Downton Pippin.

PROPAGATION.

By Seed.—The apple pip never gives birth to a seedling tree yielding fruit like that of its parent; and, which is still more strange, every pip from the same apple will produce a seedling differing from the others. The vast majority of seedlings are mere crabs; but care and judgment in selecting the parents

of which the good qualities are required to be united in the offspring, will partially obviate this tendency of returning to the original wilding.

The sorts of apples proper for crossing or reciprocal impregnation, appear to be those which have a great many qualities in common, but some different qualities. Thus the Golden Pippin has been crossed so as to produce a good offspring, by other Pippins or Rennets, and not by Calvils or Codlings. A small sized apple, crossed by a large sort, will be more certain of producing a new variety than the above mode, but will be almost equally certain of producing a variety destitute of valuable qualities. Mr. Knight's mode of cutting out the stamens of the blossoms to be impregnated, and, afterwards, when the stigmas are mature, introducing the pollen of that intended for the male parent, is unquestionably the most scientific mode of performing the operation. In this way he produced those excellent apples, the Downton, Red and Yellow Ingestrie, and Grange Pippins, from the same parents, viz., the seed of the Orange Pippin impregnated by the pollen of the Golden Pippin. The Bringwood Pippin he produced from the Golden Pippin, impregnated with the pollen of the Golden Harvey apple.

In crossing to produce new varieties, some fixed purpose should be adhered to, and prosecuted accordingly. Thus, if a dessert apple is desired, flavour

must of course form the most prominent object ; and that flavour must be accompanied by abundance of juice, or the produce will be worthless. Nothing can redeem the want of the latter quality, for we are acquainted with apples equal in flavour to the celebrated Ribston Pippin, and yet we cannot place them on the table through the absence of the latter property. Keeping properties should, moreover, be ever kept in view, unless the object be to produce a good early apple. With regard to the juicy qualities, we would, above all, recommend frequent trials with the Old Nonpareil as one parent, for, up to the present period, we believe it to be unrivalled as to the abundance and various characters of its juice, and that up to a very late period in the spring. Mellowness or tenderness of texture is also another great consideration, for few like a hard-fleshed apple. The Kerry Pippin is perhaps the highest flavoured autumn apple in the country, and had it the mellow texture of the Nonpareil it would stand unrivalled in every respect ; it is, however, hard, and this is indeed its only fault. Bearing properties should also be kept in view, for bad bearers are by no means to be tolerated in these days, when so much choice exists. When the object is to produce a good kitchen apple, good baking or boiling properties must of course stand first on the list ; and next to this, we should say, long keeping and prolific habits. The John apple, or, as it is

called by the Horticultural Society of London, the Northern Greening, is the best baking and longest keeping apple we have. This might well be selected as the parent, on one side, of a superior kitchen apple : it is, moreover, of very sound constitution.

We would strongly advise that little crossing should take place between kitchen and table apples ; the produce of such can only in the main tend to confuse : the country is full of such apples, which, in general, possess no decided character.

The pips of apples that will not keep until the spring are best sown in the autumn, but if the apples will continue undecayed, the pips should be kept in them until March, and then be sown. The largest and most convex pips usually produce the most valuable varieties. Sow them in pots or border of light rich loam ; bury the seed an inch deep, if in a border, six inches apart each way. Mr. Loudon says that at the end of the year the seedlings should be transplanted into nursery rows, from six inches to a foot apart every way. Afterwards they should be removed to where they are to produce fruit ; and for this purpose the greater the distance between the plants the better. It should not be less than six or eight feet every way. The quickest way to bring them into a bearing state, Williams of Pitmaston considers, is to let the plants be furnished with lateral shoots, from the ground upwards, so disposed as that the leaves

of the upper shoots may not shade those situated underneath, pruning away only trifling shoots. By this mode, fruit may be had from seedling apples at four, five, and six years of age, instead of waiting eight, ten, and even fifteen years, by the usual mode of planting close, and pruning to naked stems.

Mr. Macdonald, a distinguished gardener in Scotland, has also succeeded in obtaining fruit from seedlings at an early period by grafting, already stated as one of the uses of that mode of propagation. In 1808, he selected some blossoms of the Nonpareil, which he impregnated with the pollen of the Golden Pippin and of the Newtown Pippin. When the apples were fully ripe, he selected some of the best, from which he took the seeds, and sowed them in pots, which he placed in a frame. He had eight or nine seedlings, which he transplanted into the open ground in the spring of 1809. In 1811 he picked out a few of the strongest plants, and put them singly into pots. In spring, 1812, he observed one of the plants shewing fruit-buds. He took a few of the twigs and grafted them on a healthy stock on a wall, and in 1813 he had a few apples. The third year (1816) his seedlings yielded several dozens, and also his grafts; and he mentions that the apples from the grafts were the largest.

If the length of time which has hitherto been required to cause seedling fruits to blossom, could be

limited to two or three years, we have no doubt that many more persons would be tempted to raise seedlings, and the sure consequence would be a vast accession of new and useful fruits ; for who shall place a limit either as to size or quality ? We do think that the thing may be accomplished in much less time by a due consideration of the conditions necessary in order to produce fructification. A sudden check after excessive luxuriance is a well-known promoter of fructiferous habits. We would, therefore, grow the young seedlings for two years in the richest loam imaginable, specially prepared. We would, in the third year, transplant them into a poorer soil, giving them plenty of room, and, of course, a perfect exposure to light ; and we would, at the same time, graft some scions from them on the healthiest old trees in the garden ; selecting those known to be great bearers, and placing the scions at the extremity of the principal shoots.

Mr. Knight states that the width and thickness of the leaf generally indicates the size of the future apple, but will by no means convey any correct idea of the merits of the future fruit. When these have the character of high cultivation, the qualities of the fruit will be far removed from those of the native species ; but the apple may be insipid or highly flavoured, green or deeply coloured, and of course well or ill-calculated to answer the purposes of the planter.

An early blossom in the spring, and an early change of colour in the autumnal leaf, would naturally be supposed to indicate a fruit of early maturity, but Mr. Knight was never able to discover any criterion of this kind on which the smallest dependence may be placed. The leaves of some varieties will become yellow and fall off, leaving the fruit green and immature; and the leaves in other kinds will retain their verdure long after the fruit has perished. The plants whose buds in the annual wood are full and prominent are usually more productive than those whose buds are small and shrunk in the bark; but their future produce will depend much on the power the blossoms possess of bearing the cold, and this power varies in the varieties, and can only be known from experience. Those which produce their leaves and blossoms rather early in the spring are generally to be preferred, for, though they are more exposed to injury from frost, they less frequently suffer from the attacks of insects—the more common cause of failure. The disposition to vegetate early or late in the spring, is, like almost every other quality in the apple tree, transferred in different degrees to its offspring; and the planter must therefore seek those qualities in the parent tree which he wishes to find in the future seedling plants. The best method Mr. Knight was able to vegetate very early in the spring, has been by introducing the farrina of the Siberian Crab into the blossom of a rich and early

apple, and by transferring, in the same manner, the farina of the apple to the blossom of the Siberian Crab. The leaf and the habit of many of the plants thus obtained, possess much of the character of the apple, whilst they vegetate as early in the spring as the crab of Siberia, and possess at least an equal power of bearing cold ; and Mr. Knight obtained two plants of the family which were quite as hardy as the most austere crab of our woods.

Grafting is the most usual and successful mode of propagating established varieties, and whip or tongue grafting are those usually adopted.

Scions.—At whatever season grafts are intended to be inserted, the branches which are to form them should be taken from the parent stock during the winter, and not later than the end of the preceding year ; for if the buds have begun to vegetate, in the smallest degree, (and they begin with the increasing influence of the sun,) the vigour of the shoots, during the first season, will be diminished ; and the grafts will not succeed with equal certainty ; though a graft of the apple-tree very rarely fails, unless by accidental injury, or great want of skill in the operator. The amputated branches must be kept alive, till wanted, by having the end of each planted in the ground, a inches deep, in a shady situation. (*Knight on Apple*, 55.)

The scions should be of one-year-old wood, one-

fourth of an inch in diameter; four to six inches long, and with not less than three buds. One bud should be low down at the tongue end of the scion, that is of the end inserted into the stock, for we have observed that scions having such a bud have generally taken the most successfully.

The part of the tree from whence the scion is taken is far from immaterial. The lower branches on the south side of the tree, provided they are well exposed to the light, and shoots from the main trunk of a branch rather than from its spray, are to be greatly preferred. Mr. Knight most approved of the shoots emitted from the main stem, being of opinion that "the decay of many varieties (such as the Gilliflower Apple, which in my estimation is and always was without a rival in the climate of England) might be greatly retarded by propagating it from scions which have recently sprung from the trunks of old trees, in obedience to the instructions of Virgil (whose authority is however generally of little value), and probably of Hyginus, 'summa ne pete flagella.'" (*Trans. Hort. Soc.* i, 149. N.S.)

With regard to the opinions here expressed, we would say that the selection of scions from new and vigorous kinds of strong constitutions and from old and partially worn out sorts, are two very different affairs. We would always take the scion from a situation fully exposed to sunlight, and from the subordi-

nate parts of trees of too gross a character, or where a dwarfing system was intended, and from the strongest shoots that could be found in those sorts suspected of wearing out.

Stocks.—Quite equal in importance to the care of selecting the scions, are the desirable means of obtaining proper stocks. A preference has generally, and justly, been given to those raised from the seeds of the native kind, or crab, as being more hardy and durable than those produced from the apple.

The offspring of some varieties of the crab, particularly of those introduced from Siberia, vegetate much earlier in the spring than other trees of the same species; and thus the inexperienced planter will probably be led to suppose, that such stocks would accelerate the vegetation of other varieties in the spring, and tend to produce an early maturity of the fruit in autumn. In this, however, he will be disappointed. The office of the stock is, in every sense of the word, subservient; and it acts only in obedience to the impulse it receives from the branches: the only qualities, therefore, which are wanting to form a perfect stock, are vigour and hardiness. In collecting the seeds to sow, it must be remembered that the habits as well as the diseases of plants are often hereditary, and attention should be paid to the state of the tree from which the seeds are taken; it should be large and of free growth, and rather in a growing

state than one of maturity or decay. The crab-trees, which stand in cultivated grounds, generally grow more freely and attain a larger stature than those in the woods, and therefore appear to claim a preference. The seeds should be taken from the fruit in the autumn, and sown in beds of good mould an inch deep. From these the plants should be removed in the following autumn to the nursery, and planted in rows of three feet distance from each other, and eighteen inches between each plant. Being here properly protected from cattle and hares, they may remain till they become large enough to be planted out; the ground being regularly worked and kept free from weeds. (*Knight on the Apple*, 50.)

They will have attained a diameter of from half an inch to an inch, the size fit for grafting, after having from one to two or three years' growth, particularly for dwarfs, or even for full and half-standards, if intended to form the stem from the graft, which is an eligible method for these trees; but if the stock is to form the stem, they will require three or four years' growth to rise to a proper height; seven feet for full, and four or five for half-standards.

The stocks thus raised from the seeds of the Crab or Wilding apple are called *free stocks*, and for full standards are much to be preferred; but for dwarfs, half-standards, and wall-trees, the *Paradise*, or, as the French term them, the *Doucin stocks* are preferable.

They are preferable because they produce trees much less vigorous and free in their growth than are those worked on free stocks. Paradise stocks are those raised from layers, cuttings, or suckers of cultivated apples. Those raised from suckers are frequently called *Dutch Paradise stocks*. For moist soils we think Paradise stocks are most suitable, and for very dry localities, the free stocks.

Do not disturb the roots of apples intended to be grafted the same season; the check in the first instance would render the success of the operation of grafting precarious. The branches or stems of trees intended to be grafted should be cut back before spring. We are quite aware that it has been recommended to remove the young trees once or twice during the time they remain in the nursery, under the idea of increasing the number of their roots: but this practice is only eligible with trees which do not readily grow when transplanted. Mr. Knight always found the growth of young apple-trees to be much retarded, and a premature disposition to blossom to be brought on by it, and could not afterwards observe that those trees, which had been twice removed, grew better than others. It has also been supposed that many small roots, proceeding immediately from the trunk, are in future growth of the tree to be preferred to a few large ones; but as the large roots of necessity branch into smaller ones, and probably extend to a

greater distance, the advantages of more transplantations than from the seed-bed to the nursery, and thence to the orchard, may reasonably be questioned. (*Knight on the Apple*, 66.)

In selecting stocks, however, for the apple, it should always be borne in mind, that the Paradise stock will not answer for the ordinary orchard standard. Apples grafted on this stock will never make such large trees as those grafted on the free or crab-stock. The Paradise stocks are therefore peculiarly fitted for a dwarfing system, and in this respect well adapted to the modern improved kitchen garden. The Paradise stock, however, is of rather tender habits, and requires a very generous kind of soil. It will not thrive either in so clayey, or so sandy, or gravelly a soil as the common crab, therefore some caution is necessary in adopting it. If any jealousy exists on this head, the same end may be obtained by using the free stock, and by transplanting it about a couple of years after grafting, first encouraging it to grow rather luxuriant. In this transplantation all tap roots should be cut away if intended for the kitchen garden, and a slight top dressing should be applied: this will soon compensate for the loss of the tap roots by an increased amount of surface fibres, which, holding more sympathy with the atmospheric action, will be found eminently conducive of bearing habits.

Grafting old Trees.—There are few plantations

now existing, in which many middle-aged trees, of diseased and unproductive varieties, are not to be found. These should be immediately regrafted ; but unless this operation be performed with more judgment than usually belongs to the common grafter, it will often be fatal to the tree. The grafts will, however, almost always succeed during the first three or four years, together with the stock. It not unfrequently happens that the scions inserted belong to as old, and as diseased, a variety as that which has been taken off ; and, in this case, the graft and the stock appear to die by mutual consent. When old trees are to be grafted, the scions of a very young and hardy variety, of extremely vigorous growth, should be selected ; and the grafts should be inserted in the large branches at some distance from the trunk ; and never, where it can be avoided, in the principal stem itself. Large scions should be used, for these take a deeper and firmer hold of the stock than small ones. The thick covering of lifeless external bark should, at the same time, or in the succeeding winter, be totally pared off, care being taken that the internal bark be not anywhere cut through. The effects of this operation will be found extremely beneficial to the tree in its future growth, and it will not be difficult to trace these effects in their cause. From very numerous experiments on the ascent and progress of the sap in trees, made by means of coloured infusions, and by

taking up the vessels in different parts, Mr. Knight was perfectly satisfied that the ascending and descending fluids are carried to every part of the tree. (*Knight on the Apple*, 85).

Root-grafting is easily practised, and it has the very strong recommendation of having as its advocate Mr. Beaton, the very excellent gardener of Sir W. Middleton, at Shrubland Park, near Ipswich. He observes, that Mr. Knight was the first who ascertained the possibility of grafting scions on pieces of the roots of the same or some allied species with success. When he made his experiments on this subject known to the Horticultural Society some thirty years since, it was looked on merely as an interesting fact in vegetable physiology. Subsequently, however, the practice began to be extensively employed in the nurseries to multiply rare plants, or such as are difficult to propagate by the more ordinary means, such as *Combretum purpureum* and so forth. Mere propagation of rare species is, however, by no means the only object to which this mode of grafting can be advantageously applied; another and a still more important one is, that by its means we gain one grand step in preventing canker in fruit-trees—perhaps the surest step of any that has yet been thought of. We all know that certain plants prefer particular soils and dislike others, but no one can tell the reason. When a young fruit-tree shews symptoms of premature decay or canker,

the fault, or rather the misfortune, is ascribed in nine cases out of ten to the subsoil ; but this is a hasty conclusion. The worst garden or orchard soil in the kingdom produces some healthy tree ; if only one, why not more of the same species or variety ? Simply because there is only one of the stocks used in this instance which prefers that particular soil. Now, if we take pieces of the roots of this particular stock and graft on them, we may reasonably expect that, other circumstances being favourable, they will produce trees as vigorous and healthy as their parent stock on that particular soil, though they might refuse to do so on soil which we would think more propitious for them. This disposition in trees cannot be scientifically explained ; practically we can easily account for its effects. Apples and pears are grafted on seedling stocks from the seeds of the wild crab, or, what is oftener the case, from seeds of the common apples and pears, which can be more readily procured. Now, seedlings of the apple and pear—indeed, seedlings of all sorts—however truly they may perpetuate species in the eyes of the botanist, are well known to differ from their parents and among themselves in constitutional peculiarities, and it is not too much to say that there are as many different kinds of stocks—that is, different constitutionally—for apples and pears in one nursery, as there are different soils in the kingdom to plant them in : this at once explains why a few

trees in an orchard are growing vigorously; while all the others are cankered or shewing signs of premature debility. We may plant, hoe, and drain our soils as we may, but nature only provides the suitable stock; and when we meet with even but one tree which flourishes in a particular soil, we need not be afterwards at a loss for stock's to suit that soil. (*Gard. Chron.* 1841, 179.)

Suckers are only obtainable for propagation of the same variety, or for forming Paradise stocks, from maiden trees, that is trees growing on their own roots; from Paradise stocks previously rooted. Maiden or other trees apt to throw up suckers are usually called *Creeping Apples*.

Layering may be resorted to as an unfailing mode of propagation with all apples, but as the branches are usually too far from the surface for them to be bent down to it, *circumposition* is the plan that may be resorted to. This differs from layering only in having the soil placed in a vessel and raised to the shoot. There are pots called *layering pots* made for this practice, and differing from the common garden pot only by having a section about an inch broad cut through one side, and to the centre of the bottom, for the admission of the shoot or branch.

M. Foulup employs small tin cases of a conical form, like the upper part of a funnel, two and three quarter inches in length, and two and a sixth inches

in width at top, narrowing towards the lower part till only sufficient room is left for the introduction of the shoot or branch intended to be propagated. These cones are supported on rods, to which they are secured by wire. Commencing with the central branches, the leaves are taken from the parts which the tin is intended to inclose; the branch is cut two-thirds through as in layering, and being inclosed by the funnel, the latter is well packed with moss. Moisture necessary for favouring the emission of roots is supplied by means of a bottle, from which the bottom is struck off, and the neck furnished with a cork, perforated so as to admit a small pigeon's feather or bit of wool to form a syphon, by means of which the moss is kept in a proper state of moisture. Hard-wooded plants are propagated in this way from the middle of May till the end of June; and the branches are sufficiently rooted to be taken off by the end of September. It is, however, necessary in all cases, to ascertain whether the branches are sufficiently rooted previously to their being separated. This is easily done by opening up the edges of the tin; when the branches are found to be sufficiently rooted they are potted off without removing the moss by which the roots are surrounded. Being moderately watered, they are immediately placed under glass on a slight hotbed, and kept shut up for a fortnight. They are then gradually exposed, and afterwards placed in the shade of large trees, so that

only half the rays of the sun shall reach them. (*Gard. Chron.*)

Budding is a mode of propagation rarely adopted for the apple, for, although the operation may be performed upon stocks much smaller than those required for grafting, yet a greater time elapses afterwards before they come into bearing than in the case of grafted specimens. One advantage of budding is, that as three or four buds may be inserted round the same branch, a good head to the tree is sooner secured. July is the best month for budding this fruit.

Cuttings.—We believe that almost all, if not all, varieties of the apple may be propagated thus. There is no difficulty in making cuttings of the Burr-knot, Codlin, and Jenetting varieties, strike root; and we have made those of many other varieties similarly strike by merely taking care that at the bottom of the annual shoot employed there should be a portion of the old wood allowed to remain. Let the cuttings be six or eight inches long; cut off the extreme point, and allow no more than two buds at the part above the soil to remain, cutting away all the buds covered by it. Let the soil be very light, press the soil about the cutting, four inches of which should be buried by the earth; water moderately, and cover with a hand-glass. If planted in a pot, and plunged in a very gentle hotbed, the rooting takes place faster

and more certainly. Plant the cuttings in February, and do not move the hand-glass, except to give water, until the rooting is effected. Air may be admitted in July, and the glass finally removed in August, and the whole transplanted into the nursery rows during October. Trees raised from cuttings always are more dwarf than those propagated in any other mode, and excellent specimens may be thus grown for forcing in pots.

It will now be seen that very similar results will be produced by the use of the Paradise stock by layering and by cuttings : they all have a tendency to a dwarfing system by exchanging tap or deep roots for fibrous surface roots. The latter are closely connected with habits of fruitfulness, as is well known, more especially in young trees.

When the crab stock is employed our ordinary loamy soils will suffice ; when, however, the Paradise stock, the layer, or the cutting is employed, the soil should receive some manuring in addition. This may frequently be applied as top-dressing, as will be shewn hereafter.

SOIL, SITUATION, AND MANURES.

THE character of the soil is of much importance with the apple, more especially in laying the foundation for a permanent orchard ; for, with regard to espaliers or dwarf standards in kitchen gardens, the

small amount required by them, through severe limitation of the shoots, is easily supplied, by placing the trees on prepared platforms, which need not be more than about five feet square, and from one to two feet in depth of soil, on a bottom of broken stones or bricks rammed hard.

To prepare the soil for a regular orchard, thorough drainage is of the utmost importance, providing the soil is too retentive of moisture ; indeed, without this, disappointment will occur even on the very best of soils. The character of the subsoil, therefore, has much to do with success in this case. If such be retentive of moisture, which will in consequence accumulate, and keep the surface soil in a sour state, the trees will inevitably become covered with moss, and liable to canker and decay at the points. In cold clayey soils, if the amount of underdraining does not prove sufficient, much rain-water may be carried away by open gutters. A deep and sound loam, of a rather tenacious character, is the best for the ordinary orchard : such, if on a gravelly or stony subsoil, will produce fine healthy trees of immense size, if of considerable depth. Where, however, the subsoil is of very damp character, too great a depth is more injurious than otherwise ; and we have known orchards of this character a total failure through deep trenching and manuring. The deep trenching in this case only serves to decoy the roots into a most pernicious me-

dium, choked up with stagnant waters at certain periods: thus, at a great depth, the soil becomes what is technically termed "sour," for the solar heat can in this case exercise no ameliorating influence.

In all cases where ground is suspected of being too damp, the trees should be planted high; indeed we always plant in such cases at or nearly on the ground level, securing a foot at least of soil beneath them, and acquiring the desired depth of soil above the ground level by throwing the trees on hillocks, or by forming continuous ridges with deep furrows between to carry off the surface waters.

Where the soil is too light, sandy, and of a loose character, a very different process becomes necessary. Here a greater depth may by all means be permitted; indeed, if the soil is of a wholesome character, it scarcely matters how deep, providing it is not made artificially deeper than the top of the substratum: this is in all planting a wrong course of proceeding, for, when the roots reach the sides of such holes, they are forced into subsoil of a very doubtful character. Of course draining is out of the question here; on the contrary, means must be taken to secure a permanency of moisture during extreme droughts. This may be accomplished by mixing marl or clay with the loose soil, and by placing such in masses beneath the soil, as an artificial substratum.

This course we have often recommended within the last twenty years; for one portion of the soil in our immediate neighbourhood is of this kind; indeed, being on the margins of a large moor, the soil is of a very poor and loose character. The small holders around this moor were in the habit of digging the ground close to the stems of their apple trees, in order to grow potatoes; what they considered making the most of their land. We have persuaded many to renounce this pernicious practice, and to keep their trees in rows, with three feet at least on each side totally uncropped, and of course undug. The benefits under such a change soon become manifest. The neighbourhood abounding in marl too, we have persuaded many, in making new plantations, to place lumps of marl beneath the trees, and also to blend the same material in a loose state all through the mass of soil. In addition to this, they collect all the lumps of turfy matter they can, weeds, &c., and mix them through the mass; and this course has always proved successful even in such a poor locality.

With regard to manures, we are rather averse to their introduction into the body of the soil, unless where the object is to obtain large trees in a short period, irrespective of their produce for the first few years. When such is the object, manuring becomes a justifiable course, and it may be introduced liberally. For ordinary gardens, however, or small orchard en-

closures, where either quick returns or a dwarfing system are desired, we would abstain from the use of manures as much as possible, unless the soil is a poor character. Some rotten manures should, however, be introduced at planting, in order to give the tree a bold start. We would always collect all the old weedy turf at hand, ditchings, &c. &c., and blend them with the soil: such will conduce more to fruitfulness and a permanency of character than exciting manures. We are not aware that any particular kind of manure is preferred by the apple: we would use them with regard to their effect on the temperature and moisture of the soil; thus, for cold and damp soils, we would use horse manure, and for dry and parching ones, that of the cow, which latter is always understood to retain moisture longer than that of the horse.

When old orchard trees are becoming exhausted, manures should by all means be liberally applied as top-dressings. In this case it is a good plan to lay bare the upper portion of the surface-roots by removing a few inches of the surface soil, and then to apply a circle of compost of good rotten manure, six inches in depth; or, what would be better, a compost composed of equal parts manure and sound fresh loam; this, with a liberal thinning of some of the most exhausted boughs, will throw fresh vigour into half-worn trees for many years.

The apple-tree succeeds best in situations which are neither high, nor remarkably low. In the former its blossoms are frequently injured by cold winds, and in the latter by spring frosts, particularly when the trees are planted in the lowest part of a confined valley. A south, or south-east, aspect is generally preferred, on account of the disturbance of the west, and the coldness of north winds: but orchards succeed well in all aspects; and where the violence of the west-wind is broken by an intervening rise of ground, a south-west aspect will be found equal to any. The trees attain their largest stature in a deep strong loam; but will grow well in all rich soils, which are neither excessively sandy, nor wet. An orchard generally is most productive of fruit when it is situated near the fold-yard, and is in consequence much trodden and manured by the cattle in the winter; and hence it will not unfrequently be found advantageous to plant on the site of any old orchard. The ground, however, in which old apple-trees have grown, is esteemed very unfavourable to young ones. When, from contiguity to the house, an orchard is planted in this kind of ground, the pear and apple should be made to succeed each other. The roots of the pear-tree descend to a greater depth in the ground than those of the apple-tree; and as the stocks of neither of these fruits will afford proper nutriment to the other, it may be questioned whether their action on the soil be perfectly similar. (*Knight on the Apple*, 67.)

The soil best suited to the apple, as already stated, is a strong loam, and it should be two feet deep, resting on a dry subsoil, and thoroughly drained, for no other cause is more productive of canker and mossiness than stagnant root-moisture. Before planting, the ground should be trenched all over full two feet deep, and drained throughout, the bottom of the main drains being not less than four feet below the surface.

When the soil on which the orchard is to be established is shallower than the depth here named as most desirable, no attempt should be made to deepen it below the level of the true surface soil. This is a fallacious mode of procedure, yet one that we have often seen practised, not only with the apple but other trees. In such cases, when holes are sunk into the subsoil, the tree is circumscribed as though in a flower-pot; and when the roots reach the level of the subsoil at the extremity of the holes, ill effects generally follow. Where the soil is too shallow, we would rather gain the requisite depth above the ordinary ground level; and if the soil is of a very adhesive character and damp, this will be found beneficial rather than otherwise: if too light and sandy, we would strongly advise putting soil of a very stiff character in the bottom of the hole, such as lumps of very adhesive loam, marl, or even pure clay. These substantial materials will contribute to the stability

and permanency of the trees during periods of draught, by furnishing moisture when the light surface soil is exhausted. In all cases, it is of much service to place stones, brickbats, chalk, or any imperishable materials on the subsoil, ramming it hard about six inches in thickness ; this will prevent the descent of tap-roots, and conduce much to a prolific habit.

STANDARD OR ORCHARD CULTURE.

Distance.—The young trees having been trained in the nursery with tolerable good heads, they should be planted with all their heads entire ; if any are intended for the kitchen garden, plant them at least forty feet distance ; and, for a full plantation, to form an orchard, allow never less than thirty feet distance every way.

It is impossible, however, to dictate any distance as universally applicable, for soil and situation ought to have a very controlling influence. Mr. Knight's rule is very judicious, where he observes that the distance between each row, as well as the space between each tree, must depend on the situation and soil. When the former is high and exposed, the trees should be closely planted to afford each other protection ; and when the latter is poor and shallow, their growth will of course be diminished, and they will consequently require less room. But in low and shel-

tered situations, and deep rich soils, where the trees are little exposed to winds, and attain a large size, wider intervals must be allowed them. In the former instances, a distance of twelve yards between each row, and half as much between each tree, will be sufficient; in the latter, twenty-four yards between each row, and eight between each tree, will not be found too much, particularly if the ground be intended for tillage after the trees have grown to a considerable size. An opinion rather generally prevails at present in favour of planting single trees at twenty or twenty-five yards distance from each other on arable grounds, and specious reasons may be offered in defence of this practice. The roots, as well as the branches, are at perfect liberty to extend themselves in every direction; but the latter are every way exposed to the storms of autumn, and to the cold winds of the spring; and trees of more hardy kinds than the apple are well known to grow much better when planted near enough to afford each other protection, than when totally insulated. It might be supposed that trees growing in distant rows will not regularly occupy the whole surface of the ground with their roots, but these always extend far beyond the branches, and will meet across very wide intervals. Closely planted orchards, where the trees afford each other protection, will ever be found most productive in a climate which is as subject as ours to great and sudden changes of

temperature ; but, nevertheless, there are situations in which single trees, particularly such whose growth is tall and aspiring, will best pay the planter and the community. When the branches of a single tree are raised moderately high from the ground by the length of the stem, the whole of the herbage beneath it receives, during some part of the day, the full influence of the sun ; and it is in consequence as readily eaten by stock of every kind, as the produce of any other part of the field. There are instances in which five or six trees, regularly dispersed over an acre of pasture, have been highly beneficial ; and Mr. Knight never saw any instance in which such a number has been any way injurious. Six of such trees, where the ground is good, and the variety properly chosen, will annually afford a produce of more than a hundred gallons of cider, which will generally be found to exceed in value the rent of the ground which produced it. Where the mode of cultivation will admit, the rows should always extend from north to south, as in this direction each part of the tree will receive the most equal portions of light and heat. (*Knight on the Apple*, 74.)

At the time of planting, trim any broken roots, but leave all the others entire. And, as soon as planted, let every one be well staked, to support them firmly upright, and prevent their being disturbed in rooting by winds. Let them also, in future, advance with all

their branches at full length, and, for the general part, take their own natural growth, and they will soon form numerous natural spurs in every part for bearing.

In pruning the apple-tree, and all other standard trees, the points of the external branches should be everywhere rendered thin, and pervious to the light, so that the internal parts of the tree may not be wholly shaded by the external parts ; the light should penetrate deeply into the tree on every side, but not anywhere through it. When the pruner has judiciously executed his work, every part of the tree, internal as well as external, will be productive of fruit ; and the internal part, in unfavourable seasons, will rather receive protection than injury from the external ones. A tree, thus pruned, will not only produce much more fruit, but will also be able to support a much heavier load of it, without danger of being broken : for any given weight will depress the branch, not simply in proportion to its quantity, but in the compound proportion of its quantity, and of its horizontal distance from the point of suspension, by a mode of action similar to that of the weight on the beam of the steelyard : and hence 150 lbs. suspended at one foot distance from the trunk will distress the branch which supports it no more than 10 lbs. at 15 feet distance will do. Every tree, therefore, will support a larger weight of fruit, without danger of being broken, in proportion as the parts of such weight are made to approach nearer to its centre.

Each variety of the apple has its own peculiar form of growth ; and this it will ultimately assume, in a considerable degree, in defiance of the art of the pruner. Something may nevertheless be done to correct whatever is defective. When the growth of any variety is weak and reclining, the principal stem should be trained to a considerable height before it be allowed to produce branches ; and if any of these take horizontal or pendent direction, they should be regularly taken off. One principal leading stem should be encouraged almost to the summit of the tree, to prevent a sudden division into two large boughs, of nearly equal strength ; for the fork which these form is apt to divide and break when the branches are loaded with fruit. All efforts to give the heads of young trees a round and regularly spreading form, whilst in the nursery, will be found injurious to the future stages of their growth. Large branches should rarely or never be amputated. In the garden culture of the apple, where the trees are retained as dwarfs or espaliers, the more vigorously growing kinds are often rendered unproductive by the excessive, though necessary, use of the pruning-knife. Mr. Knight always succeeded in making trees of this kind fruitful by digging them up, and replacing them, with some fresh mould, in the same situation. The too great luxuriance of growth is checked, and a disposition to bear is in consequence brought on. (*Knight on the Apple*, 91.)

If the branches are judiciously reduced in number as the tree progresses, no severe pruning will be required. Care, of course, must be taken to remove any cross-growing, chafing branches; and if this be done whilst they are growing, and the cut is made smoothly and close to the trunk, the wound will speedily heal over. All dead and broken branches should be removed as soon as noticed.

Some gardeners, however, prefer a more regular and systematic course of pruning, and they usually adopt the following as detailed by Mr. J. Clarke, gardener to the Earl of Lonsdale, at Whitehaven Castle, Cumberland. The season for pruning, with such, commences as soon as the fruit is taken off the trees, and may be continued to the middle of March; during that time cut out all the ill-placed shoots, such as incline to grow towards the centre, or into each other, and leave untouched all those that stand in such a way that the tree will form a cup, or something like a well-blown tulip, all the branches standing perfectly clear of each other, so that they will bear as much fruit on the inside as on the outside, the sun and air getting to all parts of the tree alike. Keep them as low as possible; this may be done by removing a limb when it is likely to get over tall, leaving a young shoot at a proper place to succeed it, and by taking out a fourth or a fifth of the old wood every year; in this way your trees will always have the ap-

pearance of being under twenty year of age. Having finished winter pruning, the next thing to be done is the shortening of the last year's wood. This is an operation of great importance, so much depending upon the nature of the season, as to whether the eyes will form wood or fruit spurs; and even the most experienced will sometimes err. To give weakly growing tree, shorten to eight or nine inches, that is, leaving a little more than one half, or just as the eyes may be of strength. The middle growth, shorten to 12 or 14 inches, that is, leaving about two-thirds, or as the wood may have a healthy, strong, and well filled eye. The luxuriant is a kind of tree very difficult to manage in warm droppy seasons, but at all risks shorten to about 16 or 17 inches, that is, leaving about three-fourths.

The season to shorten last year's wood is in April, and sometimes as late as May. Never shorten until the tree begins to grow, that is when the sap has begun to fill up the buds at the top of the tree; this is known by the buds becoming crimson, or of a rose colour, and a little swelled, always choosing to cut above a bud on the outside, placing the back of the knife towards the centre of the tree, and cutting upwards in a slanting direction about half an inch above the eye. The difference of trees with respect to time of breaking their buds is a full fortnight, which gives plenty of time for one person to go through

a large orchard. It will frequently happen that instead of only the extreme bud breaking into wood, three, or sometimes four will break ; in this case, at next winter's pruning shorten all such down to two eyes, unless there be a branch wanted to fill up a vacancy. Then choose one well placed, and shorten it at the same time as the extreme shoot, only a little shorter ; my reason for this is, if this and the extreme shoot were stopped both of a length, the sap would flow more freely to the top of the tree, the buds would break there more regularly, and the second shoot would only break about two-thirds or three-fourths of its length, and leave a portion at the lower end naked and unfruitful.

Mr. Clarke's practice, as here detailed, seems more adapted to the kitchen garden than the common orchard, and even there some portions of the practice must be received with caution. We think that there is no necessity for hollowing the tree out in the centre, like, as he observes, " a well-formed tulip : " such must be productive of a loss of fruit. Some of the very late ripening dessert kinds might possibly be benefitted by it in point of flavour, such, for instance, as the Nonpareil class. In our experience, however, we have always found it best to have two chances of fruit ; one from the interior short branches or spurs, and the other from the extremes of the principal shoots ; which, if not too severely pruned, will gene-

rally bear on the two-years-old wood. Sometimes the frost will destroy all the exposed blossom, and in such cases a tolerable crop will not unfrequently be preserved in the interior of the tree ; which, although not quite equal to the fruit from the extremities of the branches, is yet of great service, especially in bad apple years.

We would also urge that by far the best mode of checking over-luxuriant trees, is to cut away a portion of the extremities of the roots ; if the tree is young, it may be taken up and replanted as directed by Mr. Knight.

As to hand-pruning in the young wood, it should ever be borne in mind, that such is of no benefit to the tree, but must rather be regarded in the light of necessity, and for the most part only applicable to the dwarf standards or espaliers of the kitchen garden. Thinning, therefore, is judicious, and timely thinning is the only operation of prime importance as to orchard trees.

DWARF STANDARDS.

DWARF standards are the best suited for cultivation in the kitchen-garden, as they do not overshadow such large surfaces of ground as is done by the full standards. The following rules for pruning them

have been furnished by Mr. Bliss and Mr. Green-shields. The following are Mr. Bliss's directions :—

Suppose your maiden tree has only one or two shoots, it is then necessary to cut them down to four or five buds, to get a sufficiency of wood to form the bottom of the tree. The following season leave about five of the most regular shoots, which will be quite sufficient, or even four, for they are none the better for being crowded with limbs from the stem. Do not leave more than six shoots at the outside, but what you take out, take out clean. The tree having stood two years without being headed down, it will throw out some young side shoots towards the top of the original shoots; these should be cut off within two buds of the bottom, allowing the original shoots to grow straight up, till they get to the height you wish them, say five or six feet or higher; then cut their tops off and keep all the young shoots spurred in every year to about two buds, nearly the same as you would a red currant tree; by this means it will throw all those spurs into bloom buds. And by pruning away all that superfluous wood, the fruit receives the whole strength and nourishment of the tree; and besides, by this method you not only throw your trees into bearing and produce more fruit, but they have the advantage of the sun. When the trees begin to get old, you may occasionally leave a clean young shoot, and the following year remove an old one, and

by so doing you will keep your trees in a young healthy, bearing state. Dwarf apples on the small paradise stock may, if required, be kept in a much less space than those described above ; and by this way of pruning, the trees may be, with proper management, kept perfectly free from the canker.

Mr. Bliss's directions for the formation of the tree are very proper, but we do think that in order to produce the neat, compact, and symmetrical espalier of the kitchen garden, shortening of the young growth must be had recourse to annually, from the period of planting. We are perfectly aware that the trees will bear earlier and better without such shortening ; but the tree will speedily grow lean and naked in the lower extremities. If, in consequence of close pruning, the roots becomes too powerful for the top, which is generally the case, root pruning judiciously managed is a certain cure. Mr. B. is rather too sanguine, we doubt, as to his mode of pruning being a preventive of canker. This disease is found on all soils, and under all systems of pruning. When a given kind, however valuable, shews a constant disposition to canker, that kind should be given up, and one better adapted to the soil substituted.

Mr. Greenshields, F.H.S., judiciously observes, and the direction is applicable to all pruning, that in thinning, cut the old wood off close to the stem or branch it was attached to : this prevents young wood

springing afterwards. When the trees are thinned of the old shoots, as above stated, the young side shoots are to be spurred in, that is, so shortened, that only two or three buds are left on them, and the leading top shoots shortened to half their length.

The following and every succeeding year, the trees to be treated in the same manner as respects the young wood, till they acquire the desired height, when the leading shoots are to be shortened, as the side shoots or spurs had been previously. When the leading shoots show an inclination to grow very luxuriantly, which is apt to be the case under this treatment, they should be prevented doing so, by cutting off part of the old wood, along with the young shoot immediately above a flower bud. This will prevent the shoot so cut from increasing in length. The spurs must be treated in a similar manner, by cutting off a small portion of the old wood along with the young, where they are getting too long.

Young trees are to be treated in the following manner. If there are more than three shoots on the plant, reduce them to that number, and shorten each to three, four, or six eyes, according to their strength. The following season reduce the number of leading shoots to six, and shorten them to three-fourths of their length, and spur in the remaining shoots. The tree should be managed in every respect in this manner until it has attained the required size, which of

course depends on the convenience and fancy of the owner, or conductor, of the garden.

Let the trees take their natural form of growth as far as the system described will permit, for Mr. Greenshields considers it of little consequence what shape is given to the tree, provided every branch is made, as it were, a long spur, with bearing-buds from the base to the extremity.

Two or three years' trial of this method only, might possibly deter many from a continuance of it, in consequence of the quantity of young wood which will be produced yearly at first, and from the apparent difficulty of getting rid of the superfluity. But the inconvenience will be ultimately surmounted, if the foregoing instructions are attended to ; and the consequence will be, the possession of both healthy and fruitful trees. To attempt to bring very old trees into this method of management, would be attended with difficulty, unless they were cut down short, and allowed to make new heads. (*Trans. Hort. Soc.* vii. 291.)

The advice here given by Mr. Greenshields is excellent, as we have proved for many years ; although we had never read Mr. G.'s paper. Under a very similar system, we have the best stock of rough espaliers at the present time that we have ever seen in a kitchen garden.

The first and main point with dwarf espaliers, is to

secure the proper staple of soil—a good and tenacious loam. The second point, and one but little inferior to the first in point of importance, is to secure the bottom against the descent of the roots into the subsoil. When the subsoil is a clean gravel, surmounted by a sound loam, it perhaps would not be prejudicial to allow them to do so ; but in cold clays, or wet subsoils of a heterogeneous character, bad effects will assuredly follow, and the trees will, moreover, have a constant tendency to form late, and, of course, immature growths, such being well-known precursors of disease in most fruit-trees.

The dwarf espalier requires a very moderate quantity of good soil, providing the staple is a sound and rather tenacious loam ; and as such loams are not readily obtainable by all parties, we would here point rather to the minimum amount under which a fair share of success may be obtained ; merely premising that the more liberal the supply of such loam, the more permanent will be the success of the tree. When the natural soil is pretty sound, or has been long under cultivation, and produces good vegetables, little indeed of pasture loam will be requisite for the dwarf standard. The best criterion of a favourable apple soil, is the production of very superior brocoli or celery : soil which grows these two crops in high perfection will generally answer well for the apple. One thing should have particular attention, and that is,

that a young tree should never be planted in soil from which an old one has been removed, however good it may be. The best plan is to exchange it for some of the ordinary soil in the adjacent quarter, which has been occupied in vegetable culture : such will be fresh to the apple in comparison with the rejected soil. From four to six barrowsful of an adhesive loam will be sufficient in a case of the kind, blending it well with the common soil. Stagnant water must, of course, be removed : without this, all other preparations will be worthless.

We invariably place stones, bricks, or cinders beneath the soil, rammed down firmly at about twenty inches below the ordinary ground level : this we hold indispensable to a dwarfing system. Whenever, as before observed, we find any of them growing too luxuriant, we throw out a circular trench, and cut a few of the extreme points of the roots away, filling in the excavation with fresh soil from the vegetable ground.

Root-cutting, however, requires some caution, and should be done with moderation. If any doubts exist as to the amount to be cut away, it is well to cut one-half the circle only ; cutting the other half in the next year, if necessary. The best time to perform this operation is, we think, the end of October : the trees will begin to make new fibres before the period of germination, which will save them from pernicious extremes.

In pruning, we make a point of shortening all the

young wood a little, if it be only a few inches. This induces the development of spurs or side shoots, which in their turn, from their base, give rise to spurs. All side shoots not wanted are shortened back, or entirely removed, in the winter's pruning; and when the principal leaders reach beyond the desired height, which with us is 12 feet, they are cut back into the two-years' wood, in the way described by Mr. Greenshields.

END OF VOL. I.

THE
GARDENER'S
MONTHLY VOLUME.

THE APPLE;
ITS CULTURE, USES, AND HISTORY.

BY GEORGE W. JOHNSON,
Author of "The Dictionary of Modern Gardening," "Gardener's
Almanack," &c.; and

R. ERRINGTON,
Gardener to Sir Philip Egerton, Bart.

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Editor of the Gardener's Almanac, Gardener's Dictionary, &c.

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THE APPLE.

WALL CULTURE.

THE apple tree is rather impatient of restraint either on the espalier rail or wall, but its disposition to a growth too vigorous may be kept within fruitful bounds by a due attention to the border and training, though the tree, even in proportion to its size, can rarely be brought to be so productive as when grown as a standard.

Border.—We have already considered this subject fully in the section on "SOIL," but as we purpose giving an extended detail of Mr. C. Harrison's mode of wall-training, we will also strengthen what we have already said upon the subject of border-making by stating his relative practice.

Make, he says, *the border* three feet deep at the wall, and two feet six inches at the front, also twelve or fourteen broad. The surface of the under stratum to have an inclination from the wall to the front of the border of twelve inches. After this is done, a drain made to run close to the wall, and in a direction

with it; also another to run parallel with it, at the front of the border, and so made that all superabundant water can be carried entirely away from the border. The drains are so constructed that the tops of them are about three inches higher than the surface of the following composed substratum. After the drains are made, place all over the surface of the under stratum, three inches thick of moderate-sized gravel, stones, or brick-bats, broken to a small size; upon this spread about one inch thick of fine gravel (or, instead of it, strong road drift); the whole is then well rolled or beaten firmly together; after this is done, about three inches more gravel or small stones is laid, which is also beaten or rolled to an even surface, but not so as to bind them very close together. (*Gard. Mag.* iii. 1.)

First Year.—Winter Pruning.—The tree is headed down just before it begins to push; in doing which, the foot is placed upon the soil, and close to the bole, in order to prevent it from being drawn up by the force which is used in the operation. The cut is made in a sloping direction towards the wall, and about half an inch above the bud which is selected for the leading shoot. The tree is cut down so that seven buds remain.

Summer Pruning.—If all the buds push (which will generally be the case), they are all permitted to grow until they have attained three inches length,

when two of them are rubbed off; those rubbed off are the third and fourth buds, counting upwards from the origin of the tree. The uppermost shoot is trained straight up the wall for a leading stem, and the remaining four horizontally along the wall, two on each side the stem of the tree. These shoots are trained nine inches apart, for when they are much nearer than this they exclude the sun and air from operating upon the buds and wood in such a manner as is required to keep the tree productive. When the leading upright shoot has attained about fifteen inches in length, the end is pinched off so as to leave it about eleven inches long. This causes shoots to be produced from the upper part of the leader thus stopped, three of which are trained in, the uppermost straight up the wall, and the others one on each side the stem of the leader. This stopping of the leading shoot is not performed later than the end of June or early in July, for, when it is done much later, those shoots which push afterwards in that season do not arrive at a sufficient degree of maturity to withstand the winter, and are frequently destroyed by frost. When it happens that a tree has not done well in the early part of the season, and the upright shoot is not of a suitable length or vigour at the proper period for stopping it, it is not to be meddled with afterwards until the winter pruning of the tree.

Second Year.—Winter Pruning.—At the middle or

end of November the tree is pruned. The upright leading shoot is now shortened down to ten inches from the place where it was last stopped. The tree will now be represented by the accompanying sketch (fig. 1). The side shoots (but termed branches) are

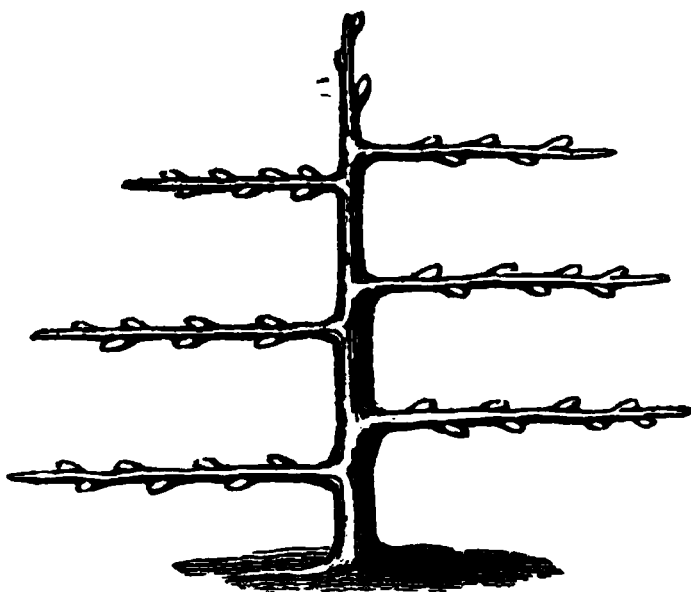


Fig. 1.

not shortened, but left their full length. If, during summer, the end of a branch should have been accidentally broken or damaged, the general consequence resulting from it is the production of several shoots or fruit buds. If shoots (which is generally the case) were produced, and were shortened during summer, agreeably to directions for similar shoots in the treatment of the tree for the second year, (see *Summer Pruning*), they are now cut down to about half an inch in length (fig. 2). If, instead of shoots, natural fruit buds should have been produced, (these are short and stiff, from half an inch to an inch in length,

and red at the ends), such are allowed to remain untouched, as it is on those that fruit are produced. The advantage of shortening back the upright shoot as much as is directed to be done is, that by it branches are certain to be produced at those places desired, so that no vacancy occurs. The leading upright shoot thus attended to will reach the top of a wall twelve feet high in seven years, which is as soon as the tree will be able to do, so as to support every part sufficiently. The tree is always loosened from the wall every winter pruning; the wall is swept and washed, also recoloured with paint or coal tar if required; the tree is also anointed with composition. Always lay some fresh mulch to the roots of the trees at this time.

Summer Pruning.—When the buds upon that part of the leading stem which was produced last have pushed, they are all rubbed off to the three uppermost. The topmost is trained straight up the wall, as a leader to the main stem; and the two others, one on each side. The instructions given for stopping the leading shoot in summer, also shortening it back in winter pruning, &c., are attended to until the tree arrives at a few inches from the top of the wall. The side branches are allowed to grow without being shortened back at any time, until they have extended as far as can be permitted, when they are pruned in every winter, by cutting back each leading shoot to

two buds from where it pushed the previous spring. Any shoots arising from the fore part of the main stem are taken clean away. The buds upon the wood made last year will this summer generally make fruitful ones. If, on the contrary (as is sometimes the case), shoots are produced instead of fruitful buds, they are allowed to grow ten or twelve inches long, until the wood attains a little hardness towards the bottom of it, when they are cut down to about two inches in length, and at the bottom part of what remains, one or two fruit buds are formed, so as to be productive in most cases the next year, but in others not until the second year. Although such a shoot was shortened as directed, yet it will generally push a shoot or more the same season from the top part of it. After such have grown a suitable length (as before described), they are cut back to about two inches from where they pushed. If more than one shoot were produced after the first shortening, and a bud or two is well swelled at the origin of the shoot (as before described), all the shoots are left, and shortened as directed ; but, if no such bud is produced, all the shoots are cut clean away excepting one, which is treated in shortening as before directed. The latter practice will generally be found necessary, and also be more advantageous, as a greater portion of sun and air is admitted to the buds, which will be considerably strengthened and forwarded to a mature state.

If after such treatment fruit buds are not produced from the origin of the shoot, nail the shoot to the wall parallel with the branch, which is uniformly successful in producing them.

Third Year.—Winter Pruning.—Such of the buds as produced wood shoots the last year, and were shortened during summer as described, are now shortened more. It frequently happens that a fruitful bud, or in some instances two, will have been formed at the lower part of the shoot (fig. 2, *a a*); such shoots are now cut off about a quarter of an inch above the uppermost of the fruitful buds (*b*); but (as is sometimes the case) if there have not been fruitful buds produced, there will be growing buds, and then the shoots are cut down so as to leave one bud (fig. 2, *c*). On some occasions the growing buds and fruit-

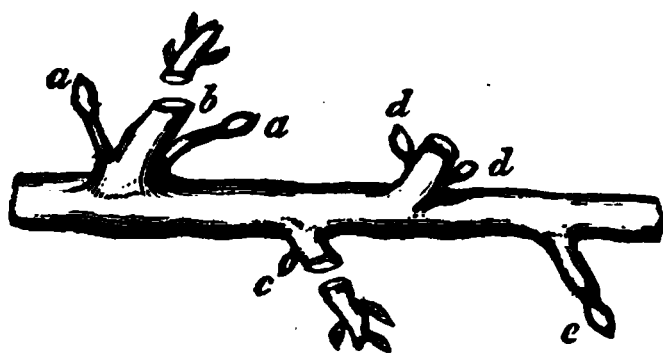


Fig. 2.

ful buds will appear but very indistinctly, and in an embryo state; when this is the case the shoots are cut down so as to leave two of those embryo buds (*d d*). There are generally some natural fruit buds which

did not push to shoots; all such are left entire (*e*). They are of a reddish colour, and are easily distinguished from growing buds, which are considerably less, and all of a dark colour.

Summer Pruning.—This summer the fruitful buds are productive. When the fruit has swelled a little, a shoot generally proceeds from the stem of the spur (which it may now be called), just underneath the fruit: such are allowed to grow eight or ten inches long, and are then shortened back to two inches, or so as to leave three eyes upon each (fig. 3, A *a*). By shortening the shoot strength is thrown into the fruit,

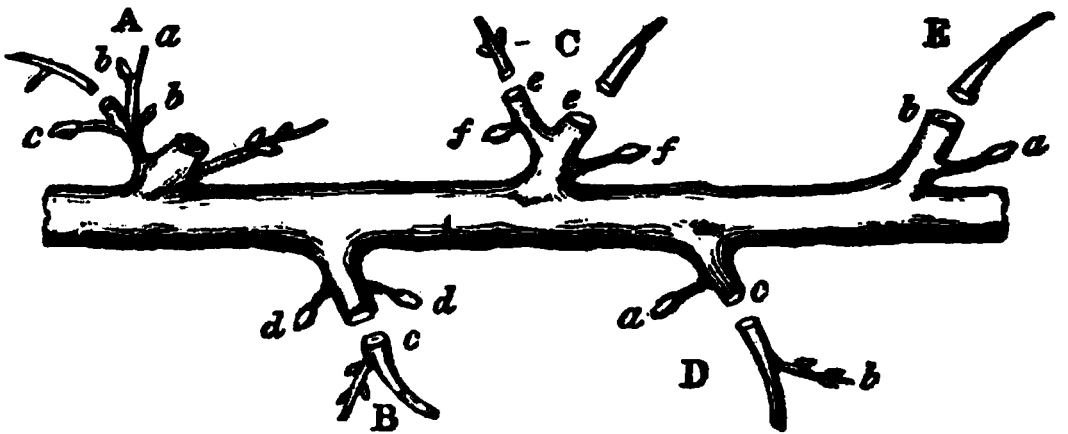


Fig. 3.

and, during the summer, two or more fruit buds are generally produced at the bottom of the shoot thus cut down (fig. 3, *b b*), or, otherwise, from the lower part of the spur (fig. 3, *c*). It sometimes occurs that, when the tree is very vigorous, some of the buds (fig. 3, *b b*) will push into shoots, or occasionally into bloom, during the latter end of summer. If shoots,

they are allowed to grow, and are then shortened, as described for similar shoots; but when bloom is produced, it is immediately cut off close under the blossom. The shoots (fig. 2, *c*) produced after the third year's winter pruning are allowed to grow, and are then shortened, as already directed for similar shoots. (See *Second Year's Summer Pruning*). The shoots which were pruned as directed last winter, and had embryo buds (fig. 2, *d d*) during this summer, generally have a fruit bud, and in some cases two, formed at their bases. The treatment of all shoots produced upon any of the spurs in future is agreeably to the previous instructions given. Always thin the fruit, and where two are situated together, take one away; this is to be done when you perceive them begin to flesh.

Fourth Year.—Winter Pruning.—The spurs (fig. 3, A B) which were productive last summer, and upon which a shoot was made and shortened (fig. 3, *a*, spur A), are now regulated in the following manner:—If there be two good fruit buds formed upon the stem of the spur (fig. 3, *d d*, spur B), all that part of it above such buds is cut away, about a quarter of an inch above the uppermost (as at *c*); but if there is only one good fruit bud upon the stem, and one upon the shoot which was cut in during the summer (as at *a*, spur A), then it is pruned off (as at spur C, *e e*), so that two buds only remain (as *f f*). When

there is only one fruit bud upon the stem of the spur (as spur D, *a*), and not fruitful buds at the shoot (*b*), then all the spur is pruned away (as at *c*). Sometimes those spurs that bear fruit will not have a shoot produced, but instead of it a fruitful bud (as spur E, *a*); it is then pruned off just above such bud.

Summer Pruning.—All shoots are pruned as already directed in the second and third years.

Fifth Year.—Winter pruning.—All the spurs are allowed to retain three fruitful buds each; but, as there are generally more than is required to keep, some of them are thinned away, retaining the best buds. The ripest buds are most plump and red at the ends. If such buds are situated near to the origin of the spur (as fig 4, spur A, *a a a*,) they are retained in preference to similar fruitful buds that are nigher

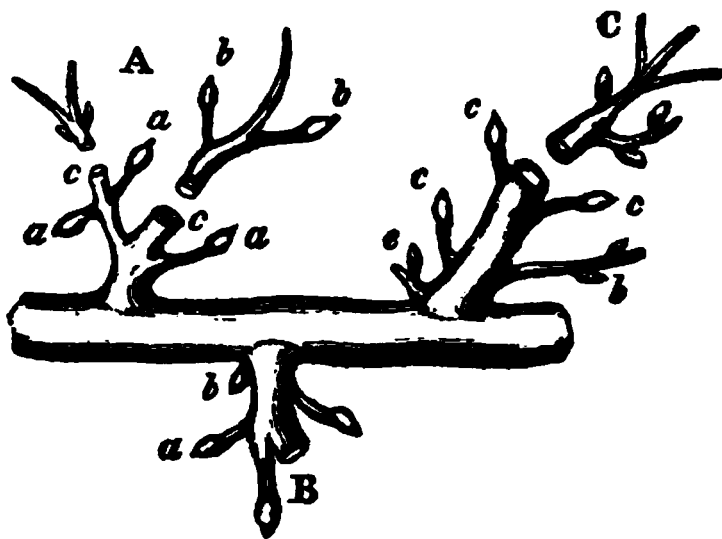


Fig. 4.

the end of the spur (as *b b*), the spur is then cut off

(as at *c c*). When there are no fruitful buds near to the origin of the spur, those are left that are farther off; but always take care to preserve the bud situated nearest to the branch which supports the spur, whether it be a growing or a fruitful one (as spur B, in which *a* is a fruitful bud, and *b* a growing one). If there be a suitable supply of buds upon the old part of the spur (as C, *c c c*), they are retained in preference to those buds formed at the bases of shoots which have been pruned during summer (*a e b*) for, when there is a proper supply on the old spur, all such shoots are cut clean away, with the exception of one that is situated near to the origin of the spur (as *e*), when that bud and the two next are only left.

Summer Pruning is performed as before directed.

Sixth Year.—Winter Pruning.—In order to convey a correct idea of the treatment of the spurs in future, it will be necessary to point them out by numbers, as 1, 2, and 3. The enumeration will proceed

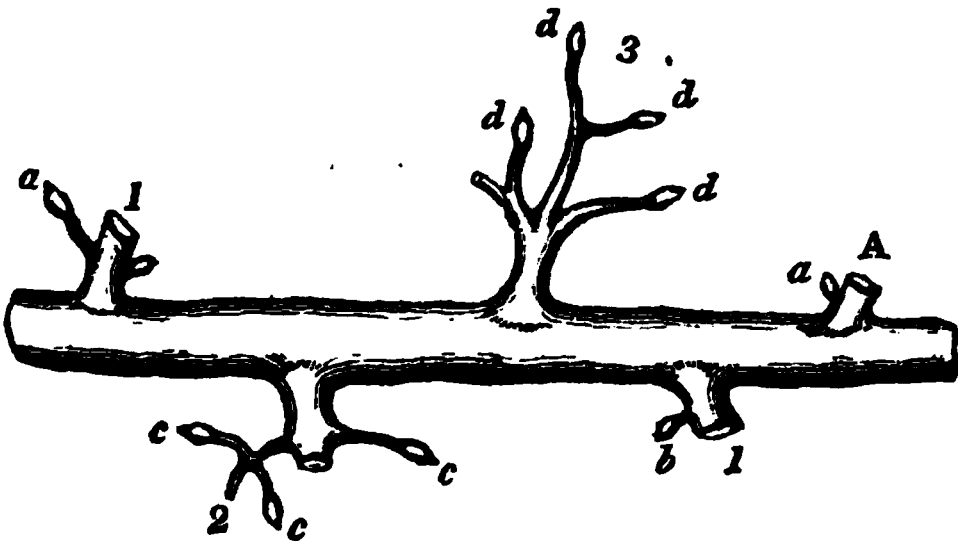


Fig. 5.

from the bole of the tree, along the branch. After three spurs are thus numbered, begin again, and proceed with No. 1, &c. (agreeably to fig 5). Every spur No. 1 is now cut down to the lowest bud there is upon it, whether it be a fruitful bud (as *a*), or a growing bud (as *b*). Every spur No. 2 to have three fruit buds (as *c c c*), and every spur No. 3 to have four fruit buds (as *d d d d*). When a spur No. 1 is destitute of either a fruitful or a growing bud towards the lower part of it, such a spur is cut down so low as only to leave about half an inch remaining (as fig. 5, A). There is generally an eye or embryo of a bud situated near to the origin of the spur (as *a*, spur A); from this a shoot or a fruitful bud is produced the ensuing summer, and thus a supply is obtained for that cut away.

Summer Pruning.—All shoots are shortened during summer, as before directed. Particular care is paid to the spurs No. 1, as a shoot or a fruitful bud is generally produced nearer to the base of the spur that was left at winter pruning, and most commonly at the opposite side of the spur to it. Either a shoot or a fruitful bud generally pushes from those spurs that were cut entirely down (as spur A, fig. 5); the shoots are cut down, as directed for others.

Seventh Year.—Winter Pruning.—The spurs No. 1 now generally have two fruit buds each; they are allowed to retain them (as fig. 6, *a a*). If, instead of

a fruitful bud, a shoot pushed (as *b*), and a fruitful bud was formed at the lower part of it, the shoot is

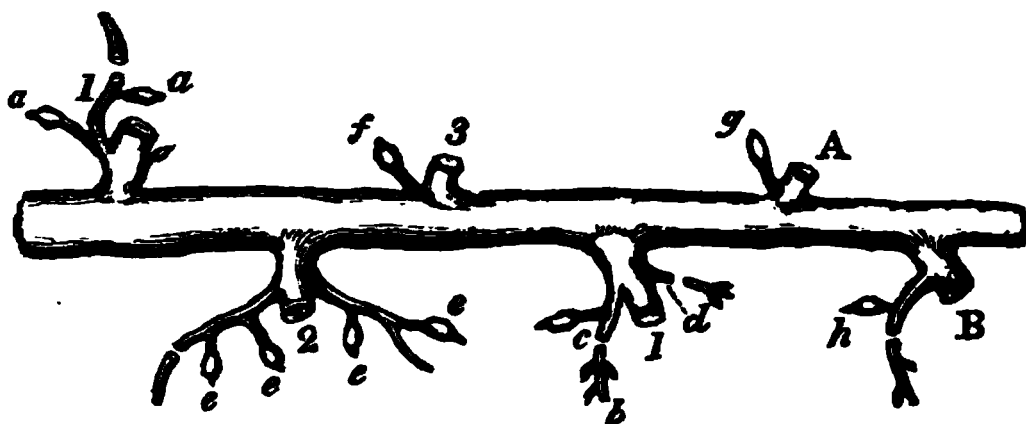


Fig. 6.

then cut off just above it (as at *c*) ; but, if there is not a fruitful bud formed, it is cut down so as to leave it an inch long (as at *d*). The spurs No. 2 have four fruit buds left upon each (as *e e e e*) ; the spurs No. 3 are now cut down, so that only one fruitful bud remains (as *f*). If a fruit bud has been produced from the spur (as spur A fig. 5), it is left entire (as fig. 6, *g*) ; but, if a shoot instead of a fruitful bud, it is cut off just above the lowest bud, whether a fruitful or a growing bud (as at *h*, spur B). This treatment to such spurs cut entirely down, is always pursued to similar ones in future.

Summer Pruning.—This is attended to agreeably to the foregoing directions.

Eighth Year.—Winter Pruning.—The spurs No. 1 are allowed to retain three buds each (as fig. 7, *a a*), and the spurs No. 2 are now cut down (as *b*) ; the spurs No. 3 are regulated as was done to spurs

Nos. 1 and 2. (See *Sixth and Seventh Year's Summer Pruning.*)

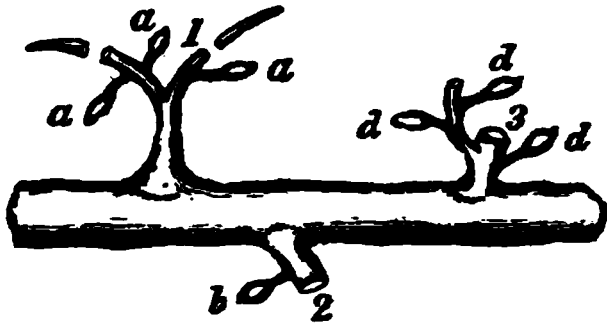


Fig. 7.

Ninth Year.—Winter Pruning.—The spurs No. 1 are allowed to have four fruit buds each (as fig. 8, *a a a a*) ; the spurs No. 1 to have two fruitful buds (as *b b*), and the spurs No. 3 to have three (as *c c c*).

Summer Pruning.—Performed as before.

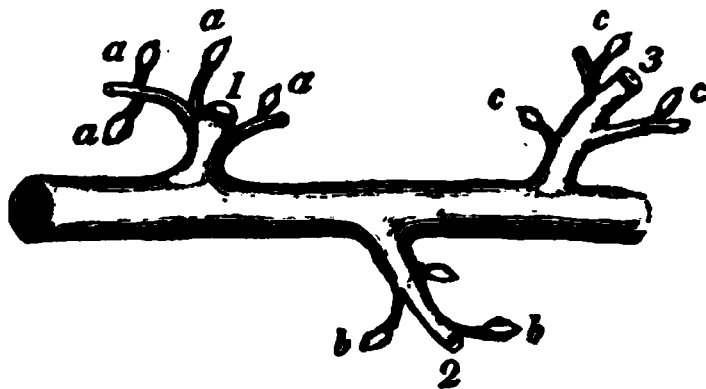


Fig. 8.

Tenth Year.—Winter Pruning.—The spurs No. 1 are now cut down again (as fig. 9, *a*, a fruitful bud, and *b*, a growing bud). The spurs No. 2 are pruned to three fruit buds (as *c c c*), and the spurs No. 3 to four fruit buds (as *d d d d*).

It will be observed that the spurs No. 1 have now

been cut down twice ; the first time in the sixth year, and the second in the tenth. Thus, those spurs cut

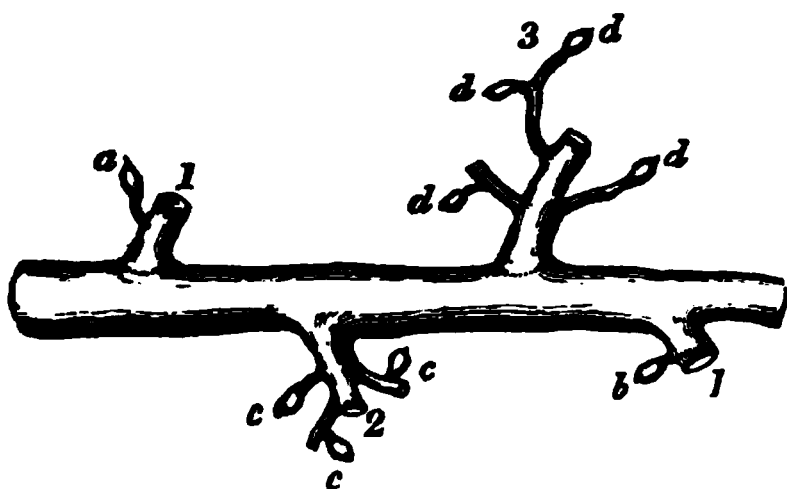


Fig. 9.

down to a fruitful bud (as fig. 5, *a*) have borne fruit four years ; and those spurs cut entirely down, or to a growing bud (as A, *b*, fig. 5), would have only borne fruit three years. In these two cases, always leave the spurs with three fruit buds each this winter, and cut them down the following winter, unless they have grown very vigorously and straggling.

The system already detailed of cutting down and renewing the spurs, is practised with all others as here directed. Thus, the next year, the spurs No. 3 are cut down (as in fig. 6, *f*) ; and the second year from this time, the spurs No. 2 (as fig. 7, *b*) ; and in the fourth year from the present time, the spurs No. 1 (as fig. 5, *a*, and fig. 9, *a*) require to be cut down again.

Conclusion.—To some the above directions may appear tedious and intricate ; but it became necessary

to enter into minute details, in order to illustrate the principle of this system of pruning, which is to obtain spurs always at a proper distance from each other, so that a suitable portion of sun and air may be admitted to them, and so that the spurs may always be kept supplied with young healthy wood and fruitful buds. (*Gard. Mag* iii. 2.)

To those who desire to make the apple a pet, and have plenty of spare time to attend to the minutiae as here detailed, the foregoing will be of immense assistance. Such a long detail, however, is rather too complicated for the many ; and we will shortly add a few plain words of advice as to the fundamental principles of wall-training ; principles which, however the thing may be carried out, must be steadily kept in view. In the first place, then, we would direct attention to the construction of the border, on which so much depends. When the expense of building walls is considered, we think that it is a mistaken economy not to take proper means to ensure success to the trees planted against them. A good sound and slightly adhesive soil must be obtained, but of this we spoke fully under the section Orchard Culture. In the next place, the border must be thoroughly drained. Mr. Harrison's directions on these heads are very complete indeed ; the only points in which we differ are in the depth of the border, and the introduction of a drain parallel with, and close to, the

wall. We think there is little occasion for the latter, more especially if a much shallower border is made. Mr. H. advises three feet deep at back ; we say two. There is no real necessity for all this expensive body of soil. It is well known that the solar rays are great ameliorators of the soil, and that, somehow or other, they conduce to the fructifying principle in fruits. Upon what grounds, then, can three feet of soil be advocated ? Deep roots have frequently been found to induce disease, more especially canker. Besides, if the tree be furnished with so much good soil, it must, if healthy, rapidly penetrate to the bottom ; and one sure consequence will be the production of much useless summer spray, and the entailment of much extra labour and attention. As to the pruning course suggested by Mr. Harrison, it appears very good ; indeed, scarcely any other course can be followed. We feel much gratified with his remarks on summer pruning ; too little attention is given to this point, and this is the besetting sin of modern training. Expensive walls are built, costly borders prepared, good trees sought out, and a most scientific mode of winter pruning carried out ; and yet the trees are barren—and why ? The reasons are obvious. It requires much light, as well as a free circulation of air, to elaborate perfect blossom buds ; and at the very period, the middle of summer, when this process is in full course, one-half the light, and much

of the free circulation of air, is arrested by a profusion of laterals, which are to be reserved for the same round of scientific winter pruning. Mr. Harrison has very properly recommended the pinching back superfluous summer laterals to about three leaves; these will assist in the elaborative process, without shading the leaves of the blossom buds. We would merely advert to another point, and that is the distance at which the leaders should be trained. Mr. H. recommends, we find, nine inches; we think this little enough; if ten or eleven, so much the better. It is not the gardener who can cram the most wood within a given space who obtains the most fruit; we think generally the reverse. However, we say, let no person think of placing them less than nine inches apart.

All the rest of Mr. Harrison's remarks are so good, and so evidently the results of an observant mind of great experience, that we need say no more on this head.

Ripeness of Fruit.—Having now passed through the various modes of cultivating the apple, we may offer a few remarks upon the modes of ascertaining the fitness of the fruit for gathering, reserving the consideration of storing to a future section. Note when the fruit *begins* to drop naturally from the tree, or, which is a better criterion to avoid loss by wind-falling, to part freely from the stem on being moved.

Failing in these outward indications of ripeness, the gardener has only to cut open a single fruit, and if the seeds appear of a black or brownish colour, it is fit to gather; but if they are not coloured, then the fruit should be allowed to hang some time longer, because, if gathered prematurely, it will very soon afterwards shrivel, and never acquire that flavour, or keep so well under the most favourable circumstances, as when it is suffered to remain on the tree until it is thoroughly matured. In no case should fruit be shaken from the tree, as we too frequently see it done; on the contrary, it ought to be all hand-picked when perfectly dry, and treated with the utmost care, to avoid bruising. When transferred from the basket in which it is gathered, to the place where it is finally to remain, the fruit should, if possible, be arranged side by side, with its eye downwards. (*Gard. Chron.* 1841, 644.)

Gathering is a point to which more than ordinary importance attaches, for the fruit should be plucked exactly at the time when it has arrived at a fit condition. This remark applies more particularly to those kinds which ripen in early autumn, and do not keep, perhaps, more than two or three months; and this can only be determined by careful and frequent examinations. The too frequent practice of waiting until the fruit begins to drop is best avoided, and it is equally bad to gather before the fruit becomes properly matured; in

the former case the fruit is apt to lose the finest part of its flavour, and never keeps in use so long as it otherwise would do ; and in the latter, owing to the imperfect elaboration of its juices, a due portion of saccharine matter is not secreted in the fruit, and consequently it never attains its proper flavour. In gathering the fruit, each should be taken by the hand, and gently lifted upwards ; the stalk will then readily separate from the branch, without breaking away the buds which are always situated near the fruit-stalk of each, and which are those that produce blossoms the next year. The circumstance that trees, after producing large crops, very frequently bear none, or but few, the following season, is occasioned as much by the careless manner of plucking—by which these buds are broken—as it is from exhaustion by reason of the excessive crop. (*Gard. Journ.* 1845, 603.)

The rules for gathering may be thus epitomized :—

1. Gather whilst the fruit requires a slight effort to separate them from the spurs.
2. Do not pull them off by main force, but bend them back until they separate from the branch.
3. Gather them in dry weather.
4. Let the gathering-baskets contain no more than a peck each, with two handles, a connecting rope, and an iron pothook.

Let each basket be lined throughout with sacking, and let the fruit of each basket be carried at once to the floor covered with sand, and taken out one by

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of espalier training in practice. These may be comprised under the following designations.

- 1st. The ordinary wood espalier rail.
- 2nd. The strained wire espalier rail.
- 3rd. The cast-iron espalier rail.
- 4th. The horizontal or table trellis.
- 5th. The trellised arcade.
- 6th. The saddle espalier.
- 7th. Pryramidal or conical training.
- 8th. Pendulous or down training.

These, we believe, will comprise all the best modes in practice, to which the apple can be subjected.

The Ordinary Wood Espalier Rail.—This is best constructed of larch, or with oak uprights, and a larch rail at top. The uprights, whether of oak or larch, should be charred and tarred, previously, at the lower end. They are placed perpendicularly, at about nine or ten inches apart, and of about five feet in height. The trees, of course, are trained horizontally, and the main leaders should be established in parallel lines, at about nine inches apart. The main fabric of the tree must be progressively formed precisely in the way recommended by Mr. C. Harrison. The stakes will not last many years, neither is it particularly necessary, as the trees, under good management, will support themselves in as short a period.

The Strained Wire Espalier Rail.—This is one of the most economical, most durable, and handsomest rails at present in use in this country; not only for training fruit trees, but for a variety of other purposes, and is by no means sufficiently known. One of its greatest merits is its simplicity; as nothing is to be seen but a few plain uprights, and the horizontal wires. The uprights should be fixed on stones however, which should rise about six inches above the ground level: this will give the whole a more finished appearance. It is stated, on pretty good authority, that this fence may be erected for the very small sum of two shillings per yard lineal. The same height, viz. five feet, may be observed here as in the wooden rail, and the trees trained in the same way.

The Cast-Iron Espalier Rail.—We merely notice these rails in due course, to observe that they are much more expensive than the former. Where high architectural finish is required, they may however be employed, as they are capable of more expression and embellishment.

The Horizontal or Table Trellis.—This is a most desirable mode of training for the possessors of small gardens, where, from the severe limitation of space, it is by no means expedient to shut out even a small amount. They will, however, from being so very near

the soil, bring many of the tenderer kinds of fruit to a much greater degree of perfection than any other mode of espalier training. They are a very suitable accompaniment of the garden walk, but it is not expedient to have a border on the walk side: it is best to let them come to the edge of the walk. They should be about a foot from the ground, and should be formed of parallel bars, like the perpendicular trellises. They may, of course, be either metallic or of wood; and we see no reason why the strained wires before described should not be employed in this case.

The Trellised Arcade.—This mode of training is of more recent introduction, and it is very ornamental. It will form a very good connecting link, or mode of transition, from the kitchen to the flower-garden, or to anything of an episodical character. In all such cases they should be high enough for head room; seven feet would be required in the centre of the arch. They should, if possible, run nearly north and south, or at least not quite due east and west; as, in that event, there would be a northern aspect, which would certainly not suit the finer sorts of apples; although it might be made available for the Morello cherry, for currants, &c. &c. The principles of construction will be familiar to any ordinary workman: strong uprights to support the fabric, and bars to train are placed parallel at nine inches apart.

The Saddle Espalier.—Little need be said about this, for it is merely the trellised arcade, divested of the tall uprights. These are extensively employed in her Majesty's gardens at Frogmore, and tend to give the whole a geometric and highly-finished appearance. These would, perhaps, be more eligible for the owners of small gardens than any of the other modes; more especially if made in the manner of the strained wire rail before described. They may be from three to five feet high in the centre, and about five feet wide at the base; the bottom wires coming to within six inches of the ground.

We have now gone through the principal forms of espalier training, as applicable to the apple; and will now proceed to say a few words about fancy modes of training, without fencing or treillage of any kind.

Pyramidal or Conical Training.—We are not aware that this mode has been applied to the apple to any extent, but we can see no reason why it should not, where space is very limited, or artistical forms are requisite, which is sometimes the case in the immediate vicinity of buildings. Fine young plants, with strong and straight shoots, must be selected for the purpose, and they must be headed back, when established, to about thirty inches, in order to cause them to develop abundance of side shoots. A leader must be selected, and trained upward to form the main stem, and this

must be successively headed back in like manner, in order to get the stem well clothed. The trees, when completed, must form a complete pyramid, the bottom side branches extending about two to three feet from the base of the trunk every way, and tapering progressively towards the summit, which may be from six to seven feet in height. The ordinary rules of thinning to admit light must be practised, together with a course of summer stopping : by the latter means alone, the strength of the tree may at all times be equalised in all its parts. Trees to be thus closely pruned, which must of necessity be the case, should be severely limited at the root. We are of opinion that, wherever such close limitation of the branches is enforced, a compost composed of one-half sound loam, and the other half broken stones, to intercept the too speedy action of the roots, would be very beneficial. This, however, we have not proved, and merely throw out the hint for those disposed to experiment in this way.

Pendulous or Down Training.—This has been practised with much success for the apple, at Croxteth Park, the seat of the Earl of Sefton, as also at some other places. We have been in the habit of looking over the Croxteth gardens for nineteen years, and can therefore speak as to the success of this mode. We have, indeed, practised it to a very great extent

with the New Flemish pears ourselves, for sixteen years ; and we must say that it is always attended with the best of success, providing due attention be given to those preparatory steps, as well as subsequent processes, which become essential.

In applying this mode to the apple, a strongstemmed and clean young tree, of about two or three years from the graft, should be selected. When established, it should be headed down to the height of four feet maximum ; this will cause it to develop four or five shoots of a long and straight character. These, then, will commence the formation of the future principal down branches of the tree. They must be bent down by some means before the month of April ; some load them with balls of clay ; some tie them down by driving a hooked stick in the ground, and attaching them by a string. In the course of the succeeding summer, the sap being partially intercepted from these pendulous shoots, more shoots will be produced from the crown ; what are wanted of these must be reserved to undergo down training in the next spring ; the rest, of course, must be stopped in due time. And thus the tree is completed, the downward shoots describing a circle at their extremities of some three to four feet from the main stem on all sides.

We have now discussed all the modes at present known, as applicable to the apple ; but it must be borne in mind, that no system of deepening soils, or

high manuring, is compatible with such highly artificial modes of culture.

FORCING.

ABOUT the forcing of the apple comparatively little is known of a systematic character; and we are not aware that any structure has hitherto been built specially for this purpose. That they can be forced there is little doubt; but we think that in the present improved character of the dessert, few persons would undergo the trouble and expense of appropriating a house to them. However, as some of our readers may desire to grow them early in pots or tubs, we will endeavour to offer a little advice as to the proper course to pursue. As to structure, we should say that a low span-roof house, running north and south, with a walk along the two sides, and the middle appropriated to the dwarf apple trees in tubs, would be the most eligible. Those who have not such a structure, might keep them in an ordinary pit, sinking for head room. There should be two sets of plants, in order that choice might freely be made when any became exhausted. The plants should be what are termed "clean maidens," and should be grown from pot to pot, and thence to the tub or box in which

they are finally to remain. The young plants might be placed in a twelve-inch pot first, and remain in it for a couple of years, and then receive a shift into one a little larger; and in a couple of years longer, they would require a roomy box or tub; after which it would be needless to shift them, as they might be sustained many years by the application of liquid manures, and by top-dressings. The young plant being potted, should be headed back to a few buds on each shoot, of which there should be at least three; if four, so much the better. A very rich and adhesive loam should be chosen, with a great thickness of old turfy sward: this should be chopped with a spade into small pieces, and what loose soil became disintegrated should be utterly rejected, using the lumpy turf alone. We do not think that it would be expedient to use any farther amount of vegetable matter, the turf being so very full; but we think that some new horse-droppings might be added; and, above all, a liberal sprinkling of bone manure of the size of radish seeds, and plenty of small charcoal.

The plants being thus established, taking care above all things that they are thoroughly drained, they should be plunged above the ground level in some light medium, such as half-decomposed leaves, or cinder ashes.

In each season, when the young shoots had grown a foot in length, we would stop them by pinching:

this will have a tendency to produce blossom spurs, and will control the too luxuriant or rapid growth of the plant. Those shoots of a subordinate character, and not so strong, may be left growing ; and this course persisted in, will constantly equalise the distribution of the sap, and keep the plants well balanced and symmetrical.

In forcing, a very moderate amount of heat must be allowed ; for it is well known that the apple succeeds best in temperate climes. If a small amount of bottom-heat could be allowed during the earlier period of forcing, or until the blossom was set, it would no doubt be an advantage ; after which period the root would require no extra stimulus, except the occasional aid of clear liquid manure. The bottom-heat, however, should not be above 70 degrees. The atmospheric treatment should much resemble that of cherry forcing, keeping up a very free circulation of air, with moist floors or others surfaces, and a very low night temperature. The forcing might commence at 50 degs. day heat, and be suffered to advance 2 degs. a week until 60 degs. was attained, beyond which it should seldom range, unless by sun heat. The night temperature should range from 40 to 45 degs. at first, advancing in a progressive way to 55 degs., which, for the most part, should be the maximum, except at the latter stages. The growth of the young wood would be a tolerably good criterion

of the mode of forcing : if this become attenuated, over-heating might reasonably be suspected. Under a proper system of forcing, it would be short-jointed. Syringing would be frequently necessary, except at the blossoming and ripening periods, when it must be entirely withheld. Liberal waterings must be given, especially when the fruit is swelling. It is well known what prejudicial effects are occasioned by drought at that period with the out-door apples. Liquid manure should be very frequently used, in a very weak state : clarified soot-water, with one ounce of guano to two gallons, would be found very eligible. During the whole of the process, the pots or tubs should be kept plunged, and some provision should be made to prevent the ingress of the worms.

The plants, when in a rest state, should receive an annual dressing on the wood, in order to keep down insects. Some lime-water, with two ounces of soft-soap to each gallon, and the addition of six ounces of flour of sulphur, would be excellent, brushing it into every crevice of the wood.

CULTIVATION OF THE APPLE AS A CIDER FRUIT.

It is not our intention to offer a thorough detail of all the practices which are pursued in the cider coun-

ties ; the limits of this work (were such at all desirable) would by no means permit such a course. Indeed, some of the practices in those districts are not such as can by any means be backed by first-rate horticulturists of the present day ; having arisen through mere expediency, and frequently betraying a lamentable ignorance of those first principles which it is absolutely necessary to understand in order to carry out any art to the perfection of which it is capable.

We will, however, advert occasionally to some of those practices, in order to throw additional light on the subject.

The subject will arrange itself under the following heads :—

- 1st. Preparation of orchard sites.
- 2nd. Mode of planting, distance, &c.
- 3rd. Under crops in the earlier stages.
- 4th. Pruning, top-dressing, renovation of decaying trees, &c. &c.

Preparation of Orchard Sites.—There is, we are given to understand, very little attention paid to the preparation of soils for orchards. Here is plain proof of how much these things are capable of improvement ; for if it is necessary to carry out a complete system of drainage for the ordinary agricultural crops, it

is surely equally so for a work which, when completed, is expected to endure for so many years ; which is so expensive in the outset, and which is capable of yielding so much profit if crowned with success.

We understand that, in the Worcester orchards, whatever drainage has taken place previously to establishing an orchard, is in general what has been carried out in the usual course of tillage : on which lands, and but seldom on grass or leys, orchards are established.

The first great matter at the outset, then, is thorough drainage ; for, although the apple affects a sound and rather adhesive loam, such must be on a very sound and somewhat dry bottom. A loam of this character, three feet in depth, on a dry and pervious bed of gravel, would be perfection itself, as regards the apple : such, however, can be seldom obtained.

About the various modes of thorough draining, we can say little here ; but merely add, that no system of open surface-gutters should be relied on : such may serve a temporary purpose, but in sour or over-retentive soils, something more is needed.

If the substratum is of a cold and barren character, means should be taken to prevent the trees forming tap-roots, and descending into this infertile medium. Any hard and imperishable material will suffice ; and the surface of this should rise a few inches above the

ordinary surface of the substratum. For of what use can it be to decoy the roots below this level? When they reach the sides of their prepared holes, they will of course be circumscribed like a flower in a garden-pot. We have known much ill-success in planting occur through this injudicious proceeding.

We think that land, after a moderate course of tillage, is in a fitter state, on the whole, for establishing an orchard, than old leys, especially if a thorough system of drainage has to be established. For although turf is a most desirable thing to imbed the apple roots in, yet the necessary porosity of the soil through raw organic matter, in abundance, might in dry periods subject the orchard to an inconvenient amount of drought; from which the well-tilled soil would comparatively escape. Soil in this state also furnishes an excellent opportunity for thorough drainage, and when this is completed, the centres between the lines of trees is directly available for either green or white crops; for hops, or for laying down to grass, if necessary.

Depth of soil is certainly a great essential in apple cultivation. It, however, so happens, that some "thin-skinned" loamy soils will grow very fine apples, providing no stagnation takes place at the root. When such is the case, we would advise by all means deepening the lines, where the apples are to be planted, at the expense of the adjacent ground. In such cases

the trees would stand upon the crown of a ridge, which should extend at least three feet on each side the tree, in the earlier stages of growth : this course will leave a deepened alley on each side, which, if the soil be sound and somewhat adhesive, will prove beneficial. This alley should retreat (if we may use the term) at frequent intervals, and of course drive away the plough or spade in a progressive way. If the orchard became very thriving, nearly a foot a year might be added to the exterior of the ridge; at least, after being planted about six or seven years. One thing we would insist on, and that is, that the three feet originally appropriated to the tree should not be cropped; or, if cropped at all, we would limit it to such crops as do not require the earth to be stirred above three inches in depth. It would be far better to lay it down in grass than to disturb the surface-roots any deeper. We are, however, informed by good authority, that young orchards under the farmer's care generally thrive better when kept broken, than in a rest state; at least, in the early stages.

By such a course, the apple might ultimately be made to "shake hands," as it is technically termed, of green crops all over the field; and in the end, one broad and deep excavation would be left between the centre of the rows, all through the orchard, which would serve as drainage and for passage.

With regard to laying the land down in grass be-

tween the trees, or planting on leys, it should be borne in mind that, if to be grazed, it is expensive and difficult to keep the trees protected from the cattle ; and as for mowing continually, it so exhausts the soil, that top-dressings of some kind will become necessary. Hops or green crops would, therefore, seem to be most eligible.

Before closing with this division of the subject, it will be well to repeat, that a sound and somewhat greasy loam is the most eligible for the apple. It matters little what the shade of colour be ; we would, however, prefer it of a bright yellowish brown, or of a hazel colour, and, by all means, of a uniform character. It is a well-known fact, according to the Hereford cultivators, that the same sorts from a lighter soil produce inferior cider to those on stiff soils. Pears, on the contrary, for perry purposes, do well on the lighter soils, and the perry is found to be of superior quality. Hence the finest cider and the finest perry are seldom found in the same localities.

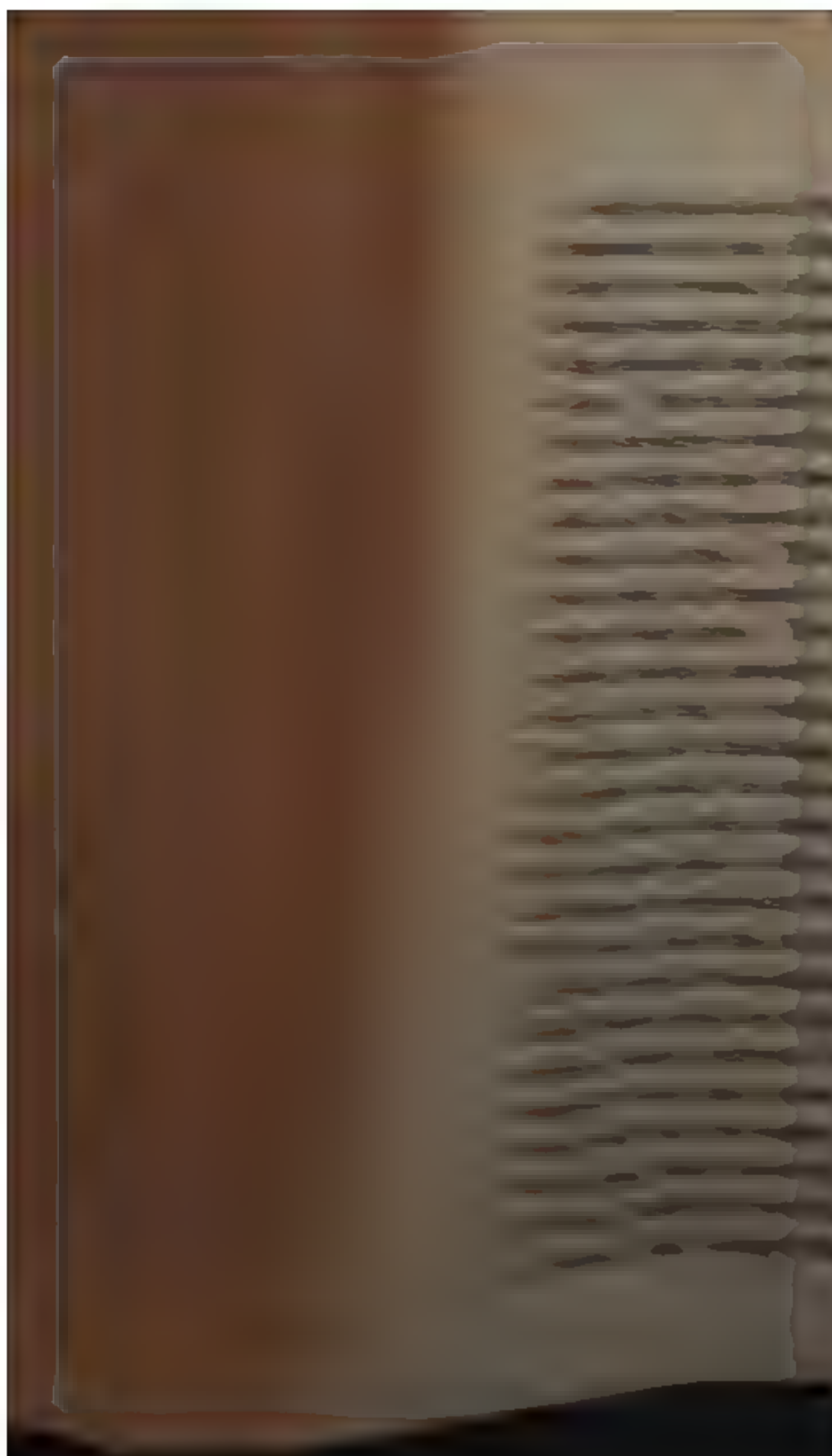
Distance, Mode of Planting, &c.—No set distance is observed in the regular orchard districts ; the practice varies much in this respect. In many of the Worcester and Hereford orchards they are far too close. We should consider fifteen yards at least as necessary ; whereas in many orchards they will be found as close as sixteen or twenty feet.

When planted thus close the branches become so

interwoven, and covered with moss, that the fruit can scarcely be seen; and these are, of course, very small and inferior. In the grass grounds of Gloucestershire, and by some superior cultivators on arable land in Herefordshire, they may be frequently met with at least twenty yards apart.

The mode of planting appears to be what is commonly termed the quincunx or angular mode: to this there need be no objection. As to the mode of planting the trees, very little ceremony is observed in general; many are what gardeners would term stuck in, rather than planted.

We would advise some pains to be taken, however; especially if the soil is not first-rate, and perhaps stubborn. In the latter case it would be necessary to open the holes in the autumn, and to let the excavated soil become mellowed through a long winter by the action of the frost. In addition, we would use a little mellow compost round each tree; such as an old manure heap, composed of furrowings and manure, which has lain a long time, and has been turned and thoroughly blended. We would also add a little mulch on the surface, to protect the roots from drought, until the trees are established. The month of November is the best time, providing the soil is mellow and the land generally in order: when, however, this is not the case, the latter end of February would be preferable.



must be admitted that, when under grass, the early spring feed is very valuable ; it has been found, however, that the trees do not make such rapid progress as when cultivation is carried on between the rows. In some parts, it is the custom to introduce the hop culture, and when this is the case, the hop-yard is in general commenced with the orchard ; the hops being counted a much better nursery than tillage. This is continued until the trees attain an inconvenient size.

Taking, therefore, the exclusion of stock of all kinds as a guiding principle, we cannot but think that white or grain crops occasionally in the earlier stages, sinking finally into a well-planned rotation of green crops, with an occasional rest for a couple of years under grass, will, on the whole, be found the most profitable and convenient.

Pruning, Top-dressing, Renovation of Decaying Trees, &c.—The trees having been duly planted after a due training in the nursery, little pruning is needed in their earlier stages ; as much, however, should be practised annually, as will cause the tree to form an expanding head, in proper form. To accomplish this, those trees which do not diverge sufficiently in their side branches, should have such pruned back for the first two or three years, taking care to cut to an eye placed where the branch is required to diverge

Under Crops in the Earlier Stages.—We before recommended at least fifteen yards distance as very eligible ; we would, however, advise a much wider distance between the lines or rows as breathing places, being persuaded that such will be found of immense utility. They will assist in setting the blossoms, will be in some degree corrective of the aptitude to gather moss, to which aged trees in confined situations are liable, and will moreover produce increased size and flavour in the fruit. The ground between will be of great service in regard of other matters, whether green or white crops. The kind of crop in use in the orchard counties, depends in part on the general economy of the farm, of which the orchard forms a part. We cannot help thinking, however, that green crops in general would be most eligible ; in the earlier stages, white or corn crops may be resorted to, but the increasing shade of the trees will ultimately render such crops too unproductive to be long persisted in. We should think that such land might be rendered of great service if constantly under green crops, providing manure could be spared for the purpose. Thus turnips, parsnips, carrots, the drumhead cabbage, the mangold wortzel, and potatoes, might alternate in a proper way, with perhaps occasionally a two years' rest in grass, which should be mowed and not eaten by cattle ; for surely it would be a most desirable thing to exclude them altogether from the orchard. It

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from. The trees at planting should be pruned rather close, making a selection of twigs so placed as to form the main fabric of the future tree ; and these should be shortened in planting to four or five buds each. Those trees which, from their own natural habit, become over-crowded with young sprays, should have a slight thinning occasionally in their earlier stages ; and in doing so, the middle of the tree should be kept rather open for a while, in order to admit light to solidify and strengthen the surrounding shoots, whilst the tree is in course of forming. We should consider that a little pruning would be beneficial every two years, even after the trees are established ; such, however, we fear, would by many be thought troublesome ; yet, when it is considered how light the task would be from its frequency, the objections will be found to possess little validity. Such pruning would be confined to the removal, in due time, of branches in thick parts of the tree, thwarting or chafing each other ; and to a light thinning of the superfluous sprays, in order to give stability to the different parts of the tree, and to facilitate the swelling of the fruit, which, when choked with competing shoots, can never attain to a due amount of perfection.

When the orchard has come into full bearing, very little pruning will be necessary ; it will for a few years almost prune itself. After a lapse of years, together with heavy crops, the trees will become rather languid ;

and at this period we would take extra steps to renovate and sustain the weakened constitution of the tree. Top-dressing now becomes necessary, and although not a matter of ordinary practice in the cider districts, yet one not the less necessary. We have known many a fine old tree sink by degrees unassisted; whilst, forsooth, young trees full of vigour, and from which the trouble and expense might well have been spared, were revelling in manures. As this is not a common practice, we will explain how we think it would be rendered practicable.

The mere shovellings of the fold-yard, or the slutch, would be excellent material for this purpose; such is generally rich in urinary matters, which would speedily be carried down by the rains to the roots. When the trees were to be renovated by such matter, it should be laid on several inches in thickness; and as such would require a good deal of manure, as well as labour, a few trees might be done each autumn.

We would pare off the turf from the surface of the roots four inches in thickness; and then lay on the manure, replacing the thick turves, in a light way. The turves should be cut in small squares of about six inches; this would afford numerous crevices for the rain to enter, in order to carry the properties of the manure to the roots.

In this way much valuable assistance might be afforded, which we have no doubt would be amply

repaid in the size of the fruit, together with the renewed constitution of the tree. To carry out, however, renovation principles to their utmost, some severe pruning would be necessary, as an adjunct to the top-dressing. This must consist in removing all inferior shoots which shew symptoms of premature decay—especially those with decayed points—and in encouraging the tree to bear more towards the extreme points, which in general retain their vigour longest in old trees.

The cutting away of main limbs should be avoided as much as possible ; this is in general productive of serious consequences to most fruit-trees ; and the late T. A. Knight, Esq., of Downton, was much opposed to the practice. The authority of such a person may well cause us to hesitate before carrying such pruning to any extent.

Concluding Remarks.—We have said nothing about nursery management, as the general principles will be found embodied in the former parts of this work. Before closing, however, we will endeavour to offer a few useful remarks on this head.

There are but few sorts of either apples or pears that extend widely over the cider districts : the sorts are for the most part local. Many farmers, after the cider or perry has been pressed from the pulp—then termed "*Must*"—lay it in drills in some spare cornre

of the field, and hereby raise hundreds of seedlings ; and many of these, if they grow kindly, are planted in the orchards, being first trained in the nursery to the required height, and their produce tried. If such are found worthless, they are of course grafted. As to farmers selecting their seeds, we believe that scarcely one in a hundred takes that trouble ; there can be no doubt, however, that this should ever be regarded as one of the fundamental steps to be taken in order to perfect an orchard system.

Many of the old cider apples, which were esteemed in former days, are now rejected, being what is termed "worn out." Thus the following is a list from an excellent judge of orcharding, a friend of ours, in Worcestershire, which points to a class of the kind.

Door Apple
Cook ditto
Peach ditto
London Pearmain
Bricklin
Old Russet
John Apple
Red Streak
Foxwhelp

} Old sorts, which should
not be continued : they
soon canker and decay.

Dalby's Kernel
Lilley's ditto
Dimmack ditto
Captain's ditto
Rushorth Pearmain
Queen's Favourite
Broughton's Kernel
Jones's ditto

} All new and good
bearers.

Thus far Worcestershire ; and similar reports might be made of the other counties. This points at once to the necessity of improved practices, especially as to care in selecting seed from proper kinds ; and especially of sound constitution : instead of raising indiscriminately from the " Must."

We would advise all who are desirous of improving on the old practices, to be particular in their nursery management. We would carefully select our seed according to the maxims previously laid down ; we would sow it on soil of a fresh character, at least not in ground which had previously been occupied in like manner ; and at transplanting time, we would sort them into three distinct samples. First we would pick out all those possessing very stout and short-jointed wood, as being likely to produce occasionally good fruit without grafting. The second selection should include all that look healthy and strong ; and the third lot we would entirely reject as being the smallest, and thereby, probably, of delicate constitution. The latter, however, might be suffered to undergo another two years' probation in the nursery, if thought desirable.

It should be borne in mind in nursery treatment, that, in rearing standards with high stems, it is necessary to practise what is termed " snagging in" by nurserymen, that is, leaving a joint or two on each of the side shoots, previous to the full development

of the head, at pruning time. This is done to give strength and thickness to the main stem, and will accomplish the matter much better than by total stripping. As soon, however, as the head is fairly formed, these must be pruned close away to the bole, in a neat and workmanlike manner.

In speaking of distance in planting, we forgot to name one fact, which must at all times influence the distance ; that is, the quality and depth of the soil. It will be seen at a glance that these have a powerful influence on the ultimate size of the tree, as well as rapidity of growth.

As the trees are liable (where cattle are introduced to the orchard) to damage of different kinds, much precaution is necessary in guarding against it. It is a very good plan, adopted in some districts, of wrapping a straw or hay rope around the stem of the young tree; if these become injured, a smearing of tar would soon deter them from meddling farther. Some persons make up a nauseous mixture, composed of night-soil, lime, cowdung and water ; to which we would by all means add a little soft-soap—say three ounces to a gallon : this, beat up into a fine paint, may be plastered on with a brush. It should ever be borne in mind, however, that such mixtures have a tendency to stop the pores of the tree ; and if carried beyond a certain pitch, in point of adhesiveness, or of producing an

impervious skin, will become prejudicial to the welfare of the tree.

One great enemy to the orchardist's success remains to be noticed, viz., the American blight.* This, if suffered to establish a footing, will be productive of more evils than all the others. The first best maxim, is to resist its first attacks, be the trouble ever so great. If, however, it unfortunately establishes a footing, we know of no better remedy, providing the orchard is not too old, than a close pruning in November of all, or nearly all, the last year's shoots, and then to apply a paint (as before recommended for the attacks of animals) composed of urine, soft-soap, and lime; thickened, if necessary, with clay. Two ounces of soft-soap to a gallon of urine, thickened with clay and lime, will make a powerful mixture, and will, if persisted in, prove effective.

DISEASES.

DISEASE is the negation of health; and as the health of a plant is the correct performance of its functions, disease may be defined to be an incorrect performance of the functions. Such incorrectness arises from four causes—vital energy declining from old age—parasites—improper food, either in quality or quantity—and

* See section "INSECTS."

inauspicious temperature. If these could be all avoided, a plant might enjoy a vigorous immortality. Such, however, is not the lot of any organized being, and in proportion to the debilitating circumstances, are the nature, the intensity, and final consequences of the disease induced. The apple-tree is liable to distempers arising from each of those causes, and its distempers, owing to its value as a fruit-bearer, have been more watched and discussed than those of any other plant. The results from those discussions are not very luminous, nor does this afford a subject for surprise, vegetable nosology being one of the most obscure paths in the whole region of human knowledge.

Canker is the most common and the very worst disease to which the apple is liable. To what cause this is attributable is at present uncertain, or whether to a combination of causes. We have always noticed one thing, and that is, that severe disrootings or root cutting, seems at least to lessen its virulence. From this we are led to think, that immature wood, transferred from stock to stock, has a strong tendency to produce it. It is not improbable, too, that the individual character of the stock has something to do in the affair; for we have an instance under our eyes of a fact or two, which rather tend to give such an impression. In 1832 we found the Hawthornden cankering so badly—not one tree, but all—that we destroyed the stock, reserving, however, a healthy graft or two;

these we put into what we deemed at the time a healthy subject—a Hick's Fancy. Strange to say, the Hawthornden, which has branched and borne fruit in profusion ever since, has never to this day shewn a spot of canker, although the tree is growing in precisely the same soil, and prepared in the same way as the original Hawthorndens were. Now, either the stock or the vital action of the leaves of the Hick's Fancy has infused new life into the Hawthornden.

Again, we have generally found trees growing on ground of a wet and sour character, or a bad subsoil, very liable to this evil ; as also trees on exhausted soils.

As to the question of the wearing-out of races, about which there has been so much debate, we know for certainty that the apples so much praised for their qualities, in books of a century ago, are not the apples of to-day ; and we have no doubt that the same disagreement existed then as to the century previous. Where are all the old Codlings, for instance, or the Russets ? Who would be bold enough to lay down an orchard of the old English Codling, or of the old Pile's Russet ? Even the Ribston Pippin, the most popular favourite ever produced—even this is fast on the wane. There is no proof that apples are any better than they were a century ago ; therefore it is not the mere love of novelty alone which has led to the introduction of so many new sorts. However, be

the cause what it may, we must consider what may be done to avoid or alleviate it.

We do not think there is much truth in Mr. Beaton's theory, which will be found in a preceding portion of this work ; viz., that a good stock having been found, it would be advisable to procure all our stocks by means of cuttings of the roots of such stock. In the next place, we advise thorough drainage, and the use of fresh loam. These are steps in the right direction, for if they have not a tendency towards the obliteration of the canker, they will at least conduce to the health and permanency of the tree.

Another point to which we would direct attention, is the placing impervious bottoms as interceptors between the soil and subsoil ; and avoiding deep soils enriched by manure. In recommendation of this practice, we may be permitted to state that we have more than a hundred trees which have been thus treated, at various periods, within the last twenty years ; and that the amount of canker with us is so trifling, that it scarcely deserves consideration at all. We make a point of thinning out all superfluous shoots every winter ; however, by the shallow border or dwarfing system, there is not a great amount of labour of this kind to perform. Ripening of the wood we conceive to be a principle of much importance, even with the natives of temperate climes ; and, although high and exciting modes of cultivation may flatter for awhile by

specious appearances, it is a grave consideration whether they do not carry serious evils in their train.

Quite consonant with our opinion that deficient ripeness of the wood of the young apple is a prime predisposing cause of the canker, is the experience and practice of Mr. Williams, of Pitmanston.

To preserve the Golden Pippin and other apples free from canker, Mr. Williams recommends every year pruning away as much of each shoot of young wood as is not perfectly ripened, which, he says, will preserve the tree as perfectly free from canker as any new variety. The best stock for the Golden Pippin he finds to be the Siberian Crab, because, as the shoots of this crab cease to elongate after the month of August, the roots become less active in propelling the upward sap; hence the wood and buds of the grafts are more perfectly ripened in the autumn. (*Trans. Hort. Soc.* vi. *art.* 64.)

The late Mr. Knight, no mean authority upon all things relative to the apple, observes that the canker is always found in those varieties which have been long in cultivation, and in these it annually becomes more destructive, and evidently arises from the age of the variety; but it often appears to be hereditary. A gravelly or wet soil, a cold preceding summer, or a high, exposed situation, adds much to its virulence. It is most fatal to young free-growing trees of old varieties; and every gardener must have noticed often

the strong shoots of these totally destroyed by it, when the old trees growing in the same orchard, and from which the grafts had been taken, were nearly free from the disease. The latter have ceased to grow larger, but continue to grow well, if not of very old kinds of fruits. The young stocks, by affording the grafts a preternatural abundance of nourishment, seem, in this instance, to have brought on the disease ; and Mr. Knight states that he always found that transplanting, or a heavy crop of fruit, which checked the growth of the tree, diminished its disposition to canker. In middle-aged trees of very old kinds a succession of young shoots is annually produced by the vigour of the stock, and destroyed again in the succeeding winter : the quantity of fruit these produce is, in consequence, very small. In this disease something more than a mere extinction of vegetable life appears to take place. The internal bark bears marks of something similar to erosion, and this Mr. Knight originally believed to be the first seat of the disease ; but subsequent observation satisfied him that the canker is a disease of the wood, and not of the bark, and led him to the conclusion that canker is never a primary or merely local disease, but arises from the morbid habit of the plant, and to be incurable by any topical application. (*Knight on the Apple*, 10.)

This last opinion is very contrary to the opinion of the mere empirical gardener ; for, whatever may be the

disease under which a plant is suffering, it is too usual for him to confine his attention to the part immediately affected. It is looked upon as a strictly local derangement, and the remedies are as erroneously topical.

To consider that because a bud, a branch, or a root is diseased, that the cause of the disorder is to be sought for there, is as sensible as to suppose that every local pain endured by the human frame arises from a disorganization of that part. On the contrary, we know that the diseases of animals arise almost universally from the stomach; and, as Addison remarked, "that physic is generally the substitute for temperance or exercise." The functions of the stomach, by whatever cause deranged, render digestion imperfect, and the secretion defective; the bile is superabundant or deficient in quantity, and head-ache is the result; the liver is diseased, and it causes a pain the most acute between the shoulders; the blood is ill elaborated, and eruptions are thrown out on the surface of the body. With plants it is the same. It may be laid down as an axiom, without exception, that all vegetable diseases, unpreceded by external injury, arise from the ill-prepared state of the sap—a state brought about conjointly or separately by the improper food imbibed, and the deranged digestive power of the leaves and other organs. That this is so will not appear strange, when we reflect, that from the sap all parts of the plant are formed, and are conti-

nually increased in number and size. The solid substance of the wood, and the temporary tender blossoms, are alike extracted from that circulating fluid. If the constituents for these are wanting, or if improper components are introduced, or if the sap is too watery, disease is the necessary consequence. Disease, which in youth and manhood usually arises from intemperance and over-excitement, visits old age as a consequence of its decayed vital powers; and, "if the silver chord has not been loosed," or "the golden bowl broken," by the short-sighted indulgence of early years, man gradually declines into the grave, as the vital organs cease to perform their office, because the limit of existence natural to his species has been attained. Some diseases peculiar to old age are prematurely induced in the usually vigorous period of life by licentious indulgences, individual or hereditary. Ossification of the vascular system is an example. In the vegetable part of the creation, the *canker* or *ulcer*, to which our apple, pear, elm, and other trees are subject, is a somewhat parallel instance. This disease is accompanied by different symptoms, according to the species of the tree which it infects. In some of those whose true sap contains a considerable quantity of free acid, as in the genus *Pyrus*, it is rarely accompanied by any discharge. To this dry form of the disease it would be well to confine the term *canker*, and to give it the scientific name of *Gangræna sicca*. In other trees,

whose sap is characterized by abounding in astringent or mucilaginous constituents, it is usually attended by a sanious discharge. In such instances, it might strictly be designated *ulcer*, or *Gangræna saniosa*. This disease has a considerable resemblance to the tendency to ossification which appears in most aged animals, arising from their marked appetency to secrete the calcareous saline compounds that chiefly constitute their skeletons. The consequence is an enlargement of the joints, and ossification of the circulatory vessels and other parts, phenomena very analogous to those attending the cankering of trees. As in animals, this tendency is general throughout their system ; but, as is observed by Mr. Knight, "like the mortification in the limbs of elderly people," it may be determined as to its point of attack, by the irritability of that part of the system. This disease commences with an enlargement of the vessels of the alburnum of a branch, or of the stem. This swelling invariably attends the disease, when it attacks the apple tree. In the pear the enlargement is less, yet is always present. In the elm and the oak sometimes no swelling occurs ; and in the peach we do not recollect to have seen any. We have never observed the disease in the cherry tree, nor in any of the pine tribe. The swelling is soon communicated to the wood, which, if laid open to view on its first appearance, by the removal of the bark, exhibits no marks of disease

beyond the mere unnatural enlargement. In the course of a few years, less in number in proportion to the advanced age of the tree, and the unfavourable circumstances under which it is vegetating, the swelling is greatly increased in size, and the alburnum has become extensively dead; the superincumbent bark cracks, rises in discoloured scales, and decays even more rapidly than the wood beneath. If the caries is upon a moderately-sized branch, the decay soon completely encircles it, extending through the whole alburnum and bark. The circulation of the sap being thus entirely prevented, all the parts above the disease of necessity perish. In the apple and the pear the disease is accompanied by scarcely any discharge; but in the elm this is very abundant. The only chemists who have examined these morbid products are Sir H. Davy and Vauquelin; the former's observations being confined to the fact, that he often found carbonate of lime on the edges of the canker in apple-trees.*

Vauquelin has examined the sanies discharged from the canker of an elm with much more precision. He found this liquor nearly as transparent as water, sometimes slightly coloured, at other times a blackish brown, but always tasting acrid and saline. From this liquor a soft matter, insoluble in water, is deposited upon the sides of the ulcer. The bark over

* Elements of Agric. Chemistry, 2nd ed. p. 246.

which the transparent sanies flows attains the appearance of chalk, becoming white, friable, crystalline, alkaline, and effervescent with acids. A magnifier exhibits the crystals in the forms of rhomboids and four-sided prisms. When the liquid is dark coloured, the bark appears blackish, and seems as if coated with varnish. It sometimes is discharged in such quantities as to hang from the bark like stalactites. The matter of which these are composed is alkaline, soluble in water, and with acids effervesces. The analysis of this dark slimy matter shews it to be compounded of carbonate of potass and ulmin, a product peculiar to the elm. The white matter deposited round the canker was composed of—

Vegetable matter . . .	60.5
Carbonate of potass . . .	34.2
Carbonate of lime . . .	5.0
Carbonate of Magnesia . .	0.3
	<hr/>
	100.0

Vauquelin calculated from the quantity of this white matter that was found about the canker of an elm, that 500lb. weight of its wood must have been destroyed.* There is no doubt that such a discharge is deeply injurious to the tree; but the above learned chemist appears to have largely erred, for he calcu-

* *Annales de Chimie*, xxi, 30.

lated from a knowledge of the amount of the saline constituents in the healthy sap, whereas in its diseased state these are much and unnaturally increased. We once were of opinion, that this disease does not arise from a general diseased state of the tree, but that it is brought on by some bruise or injury, exasperated by an unhealthy sap consequent to an unfavourable soil, situation, and culture ; but more extensive and more accurate examinations convince us that the disease is in the tree's system ; that its juices are vitiated ; and that disease will continue to break out independent of any external injury, so long as these juices continue peccant and unaltered. This conclusion will be justified, we think, by the preceding facts, as well as by those distributed through the following pages.

The disease is not strictly confined to any particular period of the tree's age. We have repeatedly noticed it in some of our lately introduced varieties that have not been grafted more than five or six years ; and a writer in the *Gardener's Magazine*, vol. 5, p. 3, states, that the trees in his orchard, though "only of four years' growth, are sadly troubled with the canker." Although young trees are liable to this disease, yet their old age is the period of existence most obnoxious to its attacks. It must be remembered, that this is not consequently a young tree which is lately grafted. If the tree from which the

scion was taken be an old variety, it is only the multiplication of an aged individual. The scion may for a few years exhibit signs of increased vigour, owing to the extra stimulus of the more abundant supply of healthy sap supplied by the stock ; but the vessels of the scion will, after the lapse of that period, gradually become as decrepid as the parent tree. The unanimous experience of naturalists agrees in testifying that every organized creature has its limit of existence. In plants it varies from the scanty period of a few months, to the long expanse of as many centuries ; but of all, the days are numbered ; and although the gardener's, like the physician's skill, may retard the onward pace of death, he will not be permanently delayed. In the last periods of life, they shew every symptom that accompanies organization in its old age,—not only a cessation of growth, but a decay of former development, a languid circulation, and diseased organs.

The canker, as already observed, attends especially the old age of some fruit trees, and of these the apple is most remarkably a sufferer. “I do not mean,” says Mr. Knight, “to assert that there ever was a time when an apple tree did not canker on unfavourable soils, or that highly cultivated varieties were not more subject to the disease than others, where the soil did not suit them. But I assert, from my own experience and observation within the last twenty

years, that this disease becomes progressively more fatal to each variety, as the age of that variety, beyond a certain period, increases ; that if an old worn-out orchard be replanted with fruit trees, the varieties of the apple which I have found in the catalogues of the middle of the seventeenth century, are unproductive of fruit, and in a state of debility and decay.”*

Among the individuals particularly liable to be infected, are those which have been marked by an excessively vigorous growth in their early years. We once had one which for the first twelve years of its existence was remarkable for the unnatural large size and abundance of its annual shoots. It then became grievously affected by canker, which at length destroyed it.

Trees injudiciously pruned, or growing upon an ungenial soil, are more frequently attacked than those advancing under contrary circumstances. The oldest trees are always the first attacked of those similarly cultivated. The Golden Pippin, the oldest existing variety of the apple, is more frequently and more seriously attacked than any other.

The soil has a very considerable influence in inducing the disease. If the subsoil be a ferruginous gravel, or if it is not well drained, and the soil be aluminous, and effective means are not adopted to

* Some doubts as to the Efficacy of Mr. Forsyth's Plaster by T. A. Knight, Esq. P.L.H.S., &c., 1802.

free it of superabundant moisture—the canker, under any one of these circumstances, is almost certain to make its appearance amongst the trees they sustain, however young and vigorous they were when first planted.

How inductive of this disease is a wet retentive subsoil, if the roots penetrate it, appears from the statement of Mr. Watts, gardener to R. G. Russell, Esq., of Chequer's Court, in Buckinghamshire. A border beneath a south wall had a soil three feet and a half in depth, apparently of the most fertile staple, twice re-made under the direction of the late Mr. Lee, of the Vineyard, Hammersmith. In this the trees, peaches and nectarines, flourish for the next three or four years after they are planted, but are then rapidly destroyed by the canker and gum. The subsoil is a stiff sour clay, nearly approaching to a brick earth; and the disease occurs as soon as it is reached by the roots of the trees.*

Mr. Forsyth concluded that the soil is not always the source of the disease, because it universally and invariably appears at first in the branches, and proceeds thence towards the roots of the tree. But this is certainly not a conclusion warranted by the premises, because the acridity of the sap, whatever may be its source, would be likely to injure and corrode,

* *Gardener's Magazine*, vi. 617.

in the first instance, those parts where the vessels are the most weak and tender ; now these, past dispute, are in the branches. Moreover, we generally see the youngest branches the earliest sufferers.

Pruning has a powerful influence in preventing the occurrence of the canker. We remember a standard russet apple tree, of not more than twenty years' growth, with a redundancy of ill-arranged branches, that was excessively attacked by this disease. We had two of its three main branches and the laterals of that remaining carefully thinned ; all the infected parts being at the same time removed. The result was total cure. The branches were annually regulated, and for six years the disease never re-appeared. At the end of that time the tree had to be removed, as the ground it stood upon was required for another purpose.

All these facts unite in assuring us that the canker arises from the tree's weakness, from a deficiency in its vital energy, and consequent inability to imbibe and elaborate the nourishment necessary to sustain its frame in vigour, and much less to supply the healthy development of new parts. It matters not whether its energy be broken down by an unnatural rapidity of growth, by a disproportioned excess of branches over the mass of roots, by old age, or by the disorganization of the roots in an ungenial soil ; they render the tree incapable of extracting sufficient nou-

ishment from the soil, consequently incapable of developing a sufficient foliage,* and therefore unable to digest and elaborate even the scanty sap that is supplied to them.

The reason of the sap becoming unnaturally saline appears to be, that in proportion as the vigour of any vegetable declines, it loses the power of selecting by its roots the nourishment congenial to its nature. M. Saussure found, in his experiments, that the roots of plants, growing in saline solutions, absorbed the most of those salts that were injurious to them, such as sulphate of copper, evidently because the declining plant lost the sensitiveness and energy necessary to select and to reject.

M. Saussure also found, that, if the extremities of the roots were removed, the plants absorbed all solutions indiscriminately.†

An ungenial soil would have a debilitating influence upon the roots in a proportionate, though less violent, degree than the sulphate of copper, and as these, consequently, would absorb soluble bodies more freely, and without that discrimination so absolutely necessary for a healthy vegetation, so the other most essential organs of nutrition, the leaves of the weakened

* No symptom of a cankered tree is more invariable than a deficiency of leaves.

† Saussure's *Recherches Chimiques sur la Vegetation*, 260.

plant, would promote and accelerate the disease. These, reduced in number and size, do not properly elaborate the sap ; and we have always found that, under such circumstances, these stunted organs exhale the aqueous particles of the sap very abundantly, whilst their power of absorption is greatly reduced. The sap, thus deficient in quantity, and increased in acridity, seems to corrode, and affect the vascular system of the tree in the manner already described.

These facts afford us most important guides in attaining the desired objects, the prevention and cure of the disease.

If superluxuriance threaten its introduction, the best remedy is for the cultivator to remove one of the main roots of the tree, and to be particularly careful not to add any fertile addition to the soil within their range. On the contrary, it will be well, if the continued exuberant growth shews its necessity, for the staple of the soil to be reduced in fertility by the admixture of one less fertile, or even of drift sand.

If there be an excess of branches, the saw and the pruning knife must be gradually applied. It must be only trees of very weak vital powers, such as is the Golden Pippin, that will bear the general cutting of the annual shoots, as pursued by Mr. Williams. A new vigorous variety would exhaust itself, the following year, in the production of fresh wood. Nothing beyond a general rule for the pruning can be laid

down, and it amounts to no more than the direction to keep a considerable vacancy between every branch, and the branch above or beneath it ; and especially to provide, that not even two twigs shall chafe against each other. The greater the intensity of light, and the freer the circulation of air amongst the foliage of the tree, the better the chance for its healthy vegetation and ripening.

If the disease, being in a fruit tree, be a consequence of old age, it is probably a premature senility, induced by injudicious management, for very few of our varieties are of an age that insure to them decrepitude. We have never yet known a tree, unless it was in the last stage of decay, that could not be recovered by giving it more air and light, by careful heading in, pruning, improvement of the soil, and cleansing the bark.

If the soil, by its ungenial character, induces the disease, the obvious and only remedy is its amelioration ; and if the subsoil is the cause of the mischief, the roots must be prevented striking into it. In all cases, it is the best practice to remove the tap-root. Many orchardists pave beneath each tree with tiles and broken bricks. If the trees are planted shallow, as they ought to be, and the surface kept duly fertile, there is not much danger of the roots striking into the worse pasturage of the subsoil. On this point, the experience of Mr. W. Nichol, the gar-

dener at Newick Place, in Sussex, agrees with our own. He says that the canker may be avoided in most instances by paying proper attention to the soil in which the tree is planted. Canker, he thinks, will seldom occur if the surface-soil is good, for in that case the roots will never descend into the prejudicial subsoil, but spread out their radicles near the surface, where they find food most abundant. If this is not kept up, the roots descend into the obnoxious substratum, and the disease assuredly follows.*

It remains for us to detail the course of treatment that we have always found successful in effecting a cure in any variety not decrepit from age, if the canker has not spread to the roots.

Having completely headed down, if the canker is generally prevalent, or duly thinned the branches, entirely removed every small one that is in the least degree diseased, and cut away the decayed parts of the larger, so as not to leave a single speck of the decayed wood, we cover over the surface of each wound with a mixture, whilst in a melted state, of equal parts tar and resin, applying it with a brush immediately after the amputations have been performed, taking care to select a dry day. We prefer this to any composition with a basis of cow-dung and clay,

* Baxter's Library of Agric. and Hortic. Knowledge, 3rd Edit. 22.

because the latter is always more or less absorbent of moisture, and is liable to injury by rain and frost, causing alternations of moisture and dryness to the wounds, that promote decay rather than their healing, by the formation of new wood and bark. The resinous plaster seldom or never requires renewal. Mr. Forsyth, the arch advocate of earthy and alkaline plasters, finding that they promoted decay, if applied to the wounds of autumn-pruned trees, recommends this important act of cultivation to be postponed to the spring. If a resinous plaster be employed, it excludes the wet, and obviates the objection to autumnal pruning. Mr. Forsyth's treatment of the trunks and branches of trees, namely, scraping from them all the scaly, dry exuviae of the bark, is to be adopted in every instance. He recommends them to be brushed over with a thin liquid compound of fresh cow-dung, soap-suds, and urine ; but we very much prefer a brine of common salt. Each acts as a gentle stimulus, which is their chief cause of benefit ; and the latter is more efficacious in destroying insects, and does not, like the other, obstruct the perspiratory vessels of the tree. The brine is advantageously rubbed in with a scrubbing, or large painter's, brush. Some persons recommend a liquid wash, containing, as prominent ingredients, quick-lime and wood ashes, which, as the disease arises from an over-alkalescent state of the sap, cannot but prove injurious, and aggravate the
 ease.

Mr. Forsyth, formerly gardener at Kensington Palace, made a considerable sensation at the close of the last, and at the commencement of the present, century, by the wonderful effects produced upon trees, as he asserted, by the following composition, used as a plaster over the wounds from which the decayed or cankered parts had been cut out:—

One bushel of fresh cowdung.

Half a bushel of lime rubbish ; that from ceilings of rooms is preferable, or powdered chalk.

Half a bushel of wood ashes.

One sixteenth of a bushel of sand ; the three last to be sifted fine. The whole to be mixed and beaten together until they form a fine plaster.*

Mr. Knight, in a very able and sarcastic pamphlet, published in 1802, entitled “Some doubts relative to the Efficacy of Mr. Forsyth’s Plaster,” fully exposed the quackery—perhaps falsehood may not be too harsh a term—of this horticulturist’s statements.

Mr. Forsyth received a parliamentary grant of money for his discovery ; but this, as Mr. Knight observes, “affords a much better proof that he was paid for an important discovery than that he made one.”

“Should the public,” continues this distinguished

* Forsyth’s Observations on Fruit Trees, p. 68.

physiologist, "believe that an old dying tree can be restored to youth and vigour, merely by being plastered with lime, cow-dung, and wood ashes, and that a piece of such tree may by such means be made immortal, I think it would be a good speculation for some enterprising genius, in imitation of the quack doctors of the sixteenth century, to bring forward a nostrum to restore and perpetuate youth in the human subject. Should such a projector join Mr. Forsyth, and the one undertake the animal, and the other the vegetable world, under Dr. Anderson's patronage, I will venture to predict that the success of each in the cures they perform will be equal."

It has been very ingeniously suggested, that, if a destruction of the bark by external violence, and, consequently, likely to terminate in canker, has occurred, it would be a good plan to insert, as in budding, a piece of living bark, exactly corresponding to the excision, from a less valuable tree.

In conclusion, we would enforce upon the orchardist's attention the importance of obtaining his grafts or buds from trees not affected by the disease, because, apparently, it is hereditary ; and, although after-cultivation may eradicate the malady, it is always far better to avoid the infection than to have to employ a remedy. (*Johnson's Principles of Gardening*, 295.)

Russet or Brown Scurf.—This imperfection of the

fruit of the apple tree is a thickening, hardening, and discoloration of its skin in a patch or patches, attended by a roughness of its skin. A distortion of the fruit and a diminution of its pulp or flesh is the consequence. Similar blotches occur upon the peach, as mentioned in our volume on that fruit, p. 176. The cause appears also to be the same in both instances, viz. exposure to sudden transitions of temperature. Mr. Williams, of Pitmaston, concurs in this opinion. He says that the alternating temperature, light, shade, dryness and moisture, which occur many times in the course of a day, when July and August are showery, are the causes of apples becoming bronzed with russet, an opinion to which he arrived after lengthened observations during many seasons. Continued rain, preceded and followed by a cloudy sky, does not seem to produce the same effect ; but the sudden intense light which commonly succeeds a shower at the time when the fruit is wet, injures the skin, and occasions small cracks, which, when viewed through a magnifying glass, resemble the cracked surface called the network of the melon. If the injury is greater, the surface turns nearly black in spots or patches. A further injury occasions the crack to become deeper, and enters the solid flesh of the apple ; but if this happens in an early stage of growth, the surface of the crack becomes dry and hard ; and if the injury is done when the fruit is nearly ripe, it rots. These accidental

injuries of the skin in the early part of the growth of the fruit, nature patches up in the way we see ; but this new surface is never like the original skin ; it allows the aqueous portion of the pulp of the fruit to escape more freely by evaporation ; hence there is a little shrinking in the part where it happens, and the juices become richer by a kind of inspissation. (*Trans. Hort. Soc.* vii. 505.)

Apple Gangrene.—We have observed a peculiar disease affecting the fruit of the apple late in the autumn, and early in the winter of 1846, and less frequently in the autumn of the present year. The interior pulp becomes brown, but of a flavour more resembling that of a ripe medlar, rather than of that bitterness so striking in a decayed apple. Another very marked characteristic of this disease, is the blackness of the outer skin. The smell of the fruit is rather vinous when cut, and somewhat resembling that of a baked apple. It comes on suddenly, and does not appear to be confined to any particular variety or district, but seems to have been only observed upon the paler and looser-textured kinds. It attacked the Cats-head in Norfolk, and the Gravenstein in Hampshire.

Moss, as it is popularly called, is a certain indication that the stems and branches on which it prevails are too freely supplied with moisture, and

too much shaded. Among the small parasitical and cryptogamic plants, constituting the moss on apple trees, are the following:—*Spiloma melanopum*, appears in the form of sooty spots. *Borrera chrysophthalma*, orange-coloured and bushy. *Tortula fallax*, in light green tufts. *Leneodon scinroides*, creeping dark green tufts. *Fonaria hygrometrica*, pale green tufts. *Orthotrichum affine*, pale green tufts. *Hypnum lutescens*, yellowish green patches; besides others still more common.

The procedure which will radically remove mossiness, is to drain the soil thoroughly, and to thin the trees to wider intervals if too close. If the branches are also too crowded, they must be gradually pruned and reduced in number.

With regard to local remedies for the immediate removal of these parasites, the branches and stems should be scraped, and then scrubbed with a strong brine made by dissolving common salt in water. It should be so strong that an egg will float in the liquor.

Mr. G. Watson, of Norton Vicarage, near Stockton-on-Tees, recommends the use of lime.

This is a very old remedy, and, in our opinion, a very bad one, for the alkaline quality of the lime promotes canker, and the lime itself clogs the pores of the bark. The glaring white colour it imparts to the trees is very disagreeable to the eye, and if this be

diminished by the addition of soot, the pores are still more injuriously plastered up.

Mr. Watson's mode of applying it is the following : —A common water-barrel, placed on a wheel-barrow, is best suited for the purpose, and it should be filled as full of water as a person can conveniently wheel it. Put in plenty of quicklime, as water will only take up a certain portion; it cannot be made too strong, but it should not be so thick as to prevent its being applied with a syringe, having a coarse rose. Mr. Watson thinks it is best to wheel it immediately to the trees, even when warm, which it will be by the slacking of the lime. It will be necessary for one person to keep stirring it while another syringes the trees; by this means a portion of the lime is carried with the water, and adheres to the trees. (*Gard. Chron.* 1843, 158.)

The Mistletoe is a parasite, undoubtedly injurious to the apple tree, and should never be allowed to grow on any valued variety. Many persons, however, like to see it on the otherwise leafless branches during winter, and it may be induced to grow on them by raising a small tongue of the bark early in the spring, on the under side of a branch, and inserting between the wood and the tongue a seed of the mistletoe.

CALENDAR.

IN drawing up a calendar of culture to run through the greater part of the year, we would wish it to be understood, as a preface, that whatever remarks are here made are intended to apply chiefly to the culture of the apple in kitchen gardens ; and although there is, of course, an identity of principle, as far as root-management is concerned, as also thinning and pruning, with those under orchard culture, yet we think it will be most desirable to give our observations a special character, and to make them as far as possible apply to the apple under the various artistical modes of training now in use. These, it is well known, are various, as we have exemplified in the preceding portion of the volume on the apple ; and although to treat the matter at large would require too much space for the limits assigned us, yet we hope so to simplify the general principles as to enable every person, however unpractised, to modify and shape his course consistently with the kind and mode of training.

JANUARY.

Whatever we can recommend for the apple, whether with regard to root or top management, in January, might be nearly as well performed either a month earlier or a month later. We deem it necessary to

say thus much, in order to give our readers some latitude for these operations, for the leisure period of one person is not at all times the same as that of another. Thus much for monthly arrangement of these matters.

Planting and pruning are now the chief operations, providing the weather is open with regard to the former. As a general maxim, however, we would say plant in the succeeding month, if it has been neglected at the best period, which, providing all things are properly arranged, we hold to be the early part of November.

Whatever pruning may be necessary should, however, proceed without delay; and this process is by no means unimportant. The future form of the tree, as well as a fructiferous habit, from the soil upwards, are matters of prime consideration to those who aim at a dwarfing system, which in modern gardening is found to produce more good fruit in less compass than the old and irregular mode. The fruit of the better table kinds is found to be, moreover, of superior quality; and the matter does not end even here: first-rate vegetables may be grown within a few feet of trees thus circumstanced; whilst under the old and unsystematic mode of sticking trees in any how, and leaving them to themselves, the production of both fruit and vegetables was rather precarious, and the latter generally of inferior character.

We will commence with ordinary rough espalier or dwarf standard. Young plants, or "maidens," as they are termed in the nurseries, which have been recently planted, should be headed rather closely back the first season. The main object, indeed, in this and the succeeding year, is to establish the future form of the tree, which is at this period easily controlled as to any desired shape. The exterior of such tree should of course be formed first, for if strong interior shoots be allowed to prevail, all efforts to produce a proper form will prove abortive. The trees for rough espaliers should therefore take what is termed by practical men "the punch-bowl shape," or the character of what the florist deems good form in the tulip. All interior shoots must be entirely removed at this period; and what exterior shoots are suffered to remain must either stand well as to the end in view, or be shortened back, in order to obtain more shoots in the next year to take the proper position. If the trees are "maidens," they must be pruned back to about four or five buds on each remaining shoot. If they have been planted a year or two, there will be plenty of shoots to select from, and the young wood may be left upwards of nine inches in length: if more is left, the shoots of many kinds will not become duly clothed with fruit-bearing spurs; and when these matters receive proper attention

the tree will be a mass of spurs from within a foot of the ground to the extremities of the shoots.

In down-training from a main stem, a much greater length of shoot may be left, providing the main stem has been formed to the desired height. Indeed, there is no occasion to shorten at all here: the young shoots may be turned down their full length at once, cutting away all those which are badly placed, and any superfluous spray.

In all other fancy modes of training, the main purpose and ultimate position of the shoots must be kept steadily in view from the first; remembering that bearing fruit is no part of the object in the earlier stages, but the establishing a good form; and it is for this latter reason that severe pruning becomes necessary.

The pruning of ordinary standard trees may now proceed. This resolves itself into thinning out, and the removal of any decaying portions. Care should be taken, in thinning the interior of such trees, to distinguish between watery shoots and wood clothed with spurs. The latter must by no means be removed, but if it produces an inconvenient amount of spray, such may be shortened back to a single eye or bud. The blossom buds in the interior of the tree will produce fruit in bad springs, when that on the exterior and better-placed wood suffers by the frost.

When standard trees are becoming somewhat exhausted, a very liberal use of the knife, and sometimes of the saw, is necessary ; for when they can no longer support the whole volume of the top, some portion must be removed, in order to strengthen the rest. When such is the case, a strict adherence to any particular form must cease, and those limbs alone should be reserved which still shew signs of vigour.

FEBRUARY.

Planting, which had been suspended on account of severe weather, must be resumed towards the middle of this month ; we would by no means throw this operation into March, if it can be avoided. With planting, mulching will become necessary ; and those trees which were planted in the autumn, if not mulched, should instantly receive a coating. This is a very important operation, whether with regard to young trees or very old ones. It encourages a rapid action of root in newly planted trees, and shields them from the vicissitudes of a drying wind, or a scorching sun. In old or over-borne trees it is equally of benefit, and should be applied early in the autumn, if possible ; at which period, the very slutch of the manure yard may, in common with the dung, be spread over the roots of such trees six inches in thickness, with much benefit.

Pruning and training operations must now be com-

pleted as soon as possible, and any renovation of soil considered necessary, should at this period have particular attention.

MARCH.

The American bug or blight is the greatest pest of the apple, and is so notorious as to need no description here. We would merely direct attention to its habits, for it will, after appearing dead or dormant, shew signs of revival at this period. We know of no better recipe for the extirpation of this pest than a thorough brushing by hand of every part of the tree, using a mixture which we will shortly describe. Before the brushing, however, the young shoots which are infested should be removed by pruning, for unless this is done, it will be difficult to search every part of the tree. The mixture we use, and which we have found effectual, is thus made:—Three ounces of soft-soap is beat up in as small a quantity of water as possible, a quart at least of fresh lime is added to this, and three handfuls of sulphur. When the whole is well mixed, we pour it into one gallon of stale urine, and add as much pure clay as when well beat up will make a thick paint. This well rubbed in, will remain on the trees for twelve months, and will destroy the bug wherever brought in contact with it.

When the mixture has become dry on the trees,

it will assume a whitish colour, and it will then be readily perceived what parts have not taken the mixture. A second application will search every crevice, laying it on thickly where deep clefts or hollows occur.

Moss may be removed by a good brushing with horse urine. We are informed by a respectable gentleman, that Dr. Darwin, of Shrewsbury, has used it extensively, and found it an excellent application, as it entirely clears moss, and quite renews the constitutional vigour of the trees.

APRIL.

Little can be done for the apple in this month, excepting taking care to complete any previous directions which may be in arrears. We would again direct attention to mulching newly planted trees, if not already done. Towards the end of this month the sun will possess much influence on the soil, and, accompanied with drought, will prevent the young trees from gaining a good start. The mulching will obviate these difficulties.

MAY.

The great business in this month is taking care of the blossoms, either in the way of protection or in picking the caterpillars out of the clusters; for they are sure to come sooner or later: no season is entirely free from them. In the early part of the month,

when the blossoms begin to open, it would be well to devise some protection to valuable kinds of table fruit. This is easily accomplished with those under espalier training. Mats, or, what is better, coarse canvass or bunting, may be hung on the rails in the evening, and removed in due time the next morning. This will, however, only be necessary when frost threatens. The trees, as before observed, should be carefully hand-picked in the end of the month ; taking care to crush the caterpillar, and to dislodge the clustered leaves. If any of the aphides appear, we would advise a good syringing with tobacco water ; three-quarters of a pound of strong shag tobacco to a gallon of water.

JUNE.

In the course of this month the young spray will begin to extend, and now it is that (on the old maxim, "prevention is before cure") we would recommend a careful attention to disbudding in due time. We are well aware that this is not commonly practised : this is not however from any objection to the principle, but few gardeners can find time for the operation at this busy period. Possessors of little gardens, and the amateur, have in general more time to devote to such matters, and to such we would specially direct our observations on this head. It is not well to disbud or totally remove all shoots which may be considered superfluous at this period ; such would tend,

in young or recently planted trees, to paralyze the action of the root. The best plan is to use the finger and thumb on all such, towards the end of this month, when they are about six inches in length: this will prevent the energies of the tree from being directed into a wrong channel, and tend to fructify the remaining branches, by admitting an increased amount of light. If any of the young trees in course of training possess leading young shoots which have taken a wrong direction, such may be disbudded altogether, providing another young shoot can be selected of some strength, and which has a tendency to assist in completing the general form of the tree.

In the early part of June, and indeed until Midsummer, much attention is necessary as to destroying caterpillars, and carrying on the picking operations suggested for May. If any of the trees begin casting their fruit, it may be considered indicative of either draught or feebleness of constitution; generally the former; and the best remedy is to give the tree a thorough soaking of water, to which some guano or other manure should be added. When valuable kinds have set too thick, they should receive a light thinning in the fruit, in the end of June; this will assist the tree much both as to the present crop and its future stability.

JULY.

A continuation of the same process as recommended for June may be carried through the month of July. In addition to this, where the trees have made very long shoots, the principal ones may have their points pinched off, when the shoots have extended over a foot in length. This will tend to solidify them, and to divert the sap to the inferior parts of the tree, and promote fructification by causing the embryo spurs to become plump; throwing more light also through the whole tree. This stopping may commence in the end of July, and be continued in a progressive way all through August, according to the strength of the shoots; and it will be found both to equalise the strength, and to increase both the size and flavour of the fruit.

In the beginning of July, training or tying down the principal young shoots on espaliers must commence. This, too, is a progressive matter, and will require a little weekly attention until the middle of August; by which time all principals should be duly placed and fastened; and whatever waste spray remains after this period, may be at once cut in to within six inches of the main shoots; such, we mean, as may have escaped the stopping recommended, or have sprung up since that operation.

AUGUST.

If the early part of August is hot and dry, we would strongly suggest the propriety of another watering, especially young trees. Trees carrying heavy crops also should receive a soaking of liquid manure, which, at this period, will work wonders. Little more can be done this month except gathering and storing some of the very early sorts, such as the Keswick Codling and the Manks Codling; these, with some others, will be ready by the end of the month. Some also of the table kinds will be fit for use or for gathering, as the Early Harvest, the Juneatings, the Margaret, and towards the end the Kerry Pippin, Hughes's Golden Pippin, &c.

SEPTEMBER.

Gathering and storing away will be carried on continuously through this as well as the succeeding months. Nothing can be done for the trees at this period. A cool room, tolerably dry, is the best for apples; and we like it best a little below the ground level. They require much ventilation for a few weeks after gathering, especially when a great body of them is placed in one room. After the sweating has ceased we would give little air, especially to them intended for long keeping.

OCTOBER.

Many of the late kinds will require gathering in this month ; indeed, it should be made a point to get all housed by the last week, be they of what kind they may, for they can receive no benefit after this period. Every possible care should be taken over the principal kinds, in order to ensure their keeping well.

NOVEMBER.

The stock and collection should now be well examined, to see if any blank exists, or any link in the chain of succession is wanting to complete the collection. New kinds, or the replacing of old or decayed trees, being determined on, some fresh maiden soil should be instantly procured, to assist in forming what we term stations for them. We have gone so much into this part of the subject in the former part of this volume on the apple, that farther comment here would be superfluous : it may suffice to say that we would direct especial attention to the principles there inculcated, of taking care that the soil used be at least fresh to the apple, and of introducing as much sound loam into the mixture as can be obtained. After planting according to these directions, let the young trees be immediately mulched. The import-

ance of this part of the process has also been dwelt on in previous remarks.

The fruit-room will now require frequent attention. Some ventilation on dry and airy days for a few hours, together with a frequent picking of the fruit, will now be necessary, in order to prevent the spread of destructive fungi. Darkness is well known to assist in the preservation of this fruit, therefore every fruit-room should have shutters to the windows, both to exclude light and injuriously low temperatures.

Pruning may now commence according to the principles laid down for January : the ample details there will supersede the necessity of any repetition here.

DECEMBER.

Nothing fresh can be offered in the way of advice for this month. In taking leave of the subject, we may merely observe that pruning and training may henceforth proceed until the whole is completed. The American blight should have attention immediately ; and it would be well to apply the dressing before recommended without delay.

INSECTS.

NONE of our fruits are more liable than the apple to the depredations of insects. They assail all its parts—blossom, leaves, stem, and root—and they are confined to no season, for some one or other of them may be found at its work of destruction whenever the scrutiny takes place.

So impressed was Mr. Knight with the opinion that of all our fruits none suffers more from insects than the apple, that he declared his belief that these are a more frequent cause of the crops failing than frost. The figure-of-eight moth (*Episema caruleocephala*), Linne denominates the pest of Pemona, and the destroyer of the blossoms of the apple, pear, and cherry. He also mentions another (*Tinea corticella*) as inhabiting apple-bearing trees under the bark. And Reaumur has given us the history of a species common in this country, and producing the same effect, often to the destruction of the crop, the caterpillar of which feeds in the centre of our apples, thus occasioning them to fall. Even the young grafts are frequently destroyed, sometimes many hundreds in one night, in the nurseries about London, by the *Curculio Vastator* of Marsh (*Otiorhynchus picipes*), one of the short-snouted weevils; and the foundation of canker in full-grown trees is often laid by the larvæ

of *Temasia Wæberana*. The sap, too, is often injuriously drawn off by a minute coccus, of which the female has the exact shape of a muscle-shell (*C. Arborum linearis*, Geoffr.), and which Reaumur has accurately described and figured. But the greatest enemy of this tree, and which has been known in this country since the year 1787, is the apple-aphis, called by some the coccus, and by others the *American blight*. This is a minute insect, covered with a long cotton-like wool, transpiring from the pores of its body, which takes its station in the chinks and rugosities of the bark, where it increases abundantly, and by constantly drawing off the sap, causes ultimately the destruction of the tree. Whence this pest was first introduced is not certainly known. Sir Joseph Banks traced its origin to a nursery in Sloane Street; and at first he was led to conclude that it had been imported with some apple-trees from France. On writing, however, to the gardeners in that country, he found it to be wholly unknown there. It was therefore, if not a native insect, most probably derived from North America, from whence apple-trees had also been imported by the proprietor of that nursery. Whatever its origin, it spread rapidly. At first it was confined to the vicinity of the metropolis, where it destroyed thousands of trees. But it has now found its way into other parts of the kingdom, particularly into the cider countries; and in 1810 so

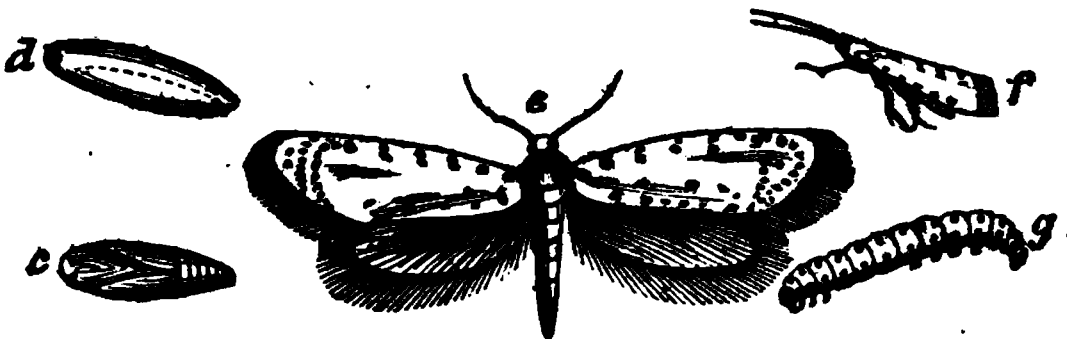
many perished from it in Gloucestershire, that, if some mode of destroying it were not discovered, it was feared the making of cider must be abandoned. (*Kirby and Spence's Entomol.* i. 199.)

Blight.—By this name, most indiscriminately applied, common observers intend every ill that invades the blossoms and leaves of the apple. If they are destroyed by an easterly wind—if they are invaded by legions of aphides—or even if caterpillars abound upon them—the convenient name of blight is adapted to the evil. To such a cloak for ignorance we cannot pay regard, but shall strictly confine ourselves to observations upon each insect marauder distinctively.

Previously to proceeding to the task, we will offer a few observations upon what is usually termed “the blighting influence of the east wind.” In England this wind is proverbially cold and dry, qualities which render it particularly liable to injure tender leaves and blossom, by subjecting them to a rapid ungenial evaporation and reduction of temperature. When so injured, when thus shrivelled and blasted, the term *blight* may well apply. But when, referring to a very different phenomenon, it is said that “the east wind has brought the aphides,” this requires a very important qualification. That such predatory insects are usually most abundant when this wind has been prevalent, does not admit of dispute; but no one,

except the most ignorant, will conclude that the wind creates them. The truth is that insects propagate with rapidity just in proportion as their food is abundant or deficient. Now the food of the aphid is the juice of the young leaves and shoots of the plant, and there is no doubt that more young leaves are put forth to succeed those which have been injured by easterly wind, and that the shoots remain then longer juicy and unripened than in seasons when more genial weather has prevailed.

Yponomeuta padella.—Small Ermine Moth.—An-



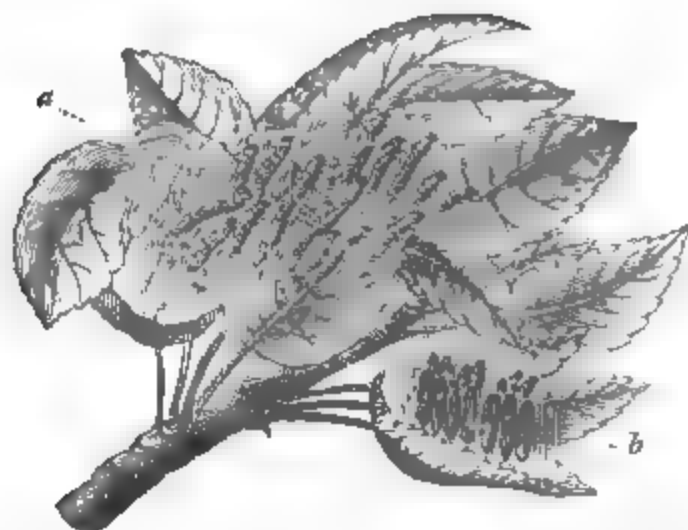
terior wings ordinarily of a leaden white, with about thirty remote minute black spots, disposed somewhat regularly in longitudinal rows, but on the hinder margin they are more irregular, and tend to a transverse disposition: cilia livid. Posterior wings lead-coloured: cilia rather paler. Extremely variable: some examples having the ground of the anterior wings white; others with the costa livid, and the inner margin white; some with a livid or pale lead-

coloured central cloud ; others, again, entirely of a pale or deep lead colour ; and all intermediate shades occur : the number of spots also varies. (*Stephens' Illust. Brit. Lepid.*, vol. iv. p. 243.)

The caterpillar (*g*, rather magnified) of this moth is of an ashy white colour, with a brownish head, and a number of small black spots, of which the largest form a series on each side of the body. It has sixteen feet, the three anterior pairs being articulated, and attached to the three anterior segments. The four following pairs are membranaceous, false, ventral legs ; and the terminal pair anal, and also membranaceous. They are below the middle size, and the body is smooth. In regard to the predilection of this caterpillar for any particular kind of food, only some kinds of apples were affected, which is the more remarkable, because its principal food (whence its specific name is derived) is the bird cherry, although the white thorn is also even more subject to its attacks ; whole hedges being sometimes entirely defoliated in summer, and covered with webs.

It is a peculiarity in the history of this insect, that it is not only social in the caterpillar state (*a*), but that it retains its sociality during the period of its pupation (*b*), the cocoons being formed within the web which had served for the abode of the caterpillars. These webs are quitted from time to time, and new encampments established at short distances from each

other ; hence, each brood constructs several webs in



the course of its caterpillar state ; the reason of which is, that the caterpillars do not quit their webs to feed, but only eat such leaves as are enclosed in each web. The number of inhabitants in a colony varies from one hundred to two hundred ; and, hence, the more numerous the colony, the more frequent is a change of residence required. These webs consist of a great number of threads not unlike spider webs, arranged somewhat irregularly, but sufficiently loose to enable the inhabitants to be seen through the covering. The caterpillars eat only the parenchyma of the upper side of the leaf ; they also arrange their threads longitudinally, each, apparently, having a thread of its own along which it moves either backwards or forwards without disturbing its neighbours, which, when in repose, are arranged side by side.

The manner in which the eggs are deposited, and the young caterpillars developed, appears first to have been noticed by Mr. Major (*Treatis*, p. 51) ; but subsequently, with more precision, by Mr. Lewis (*Trans. Ent. Soc.* i. p. 22). The former writer states that, on the 29th of July, he found the parent coating her eggs over, which she appeared just to have been depositing, with gummy matter (employing her tail in the operation), which, when dry, forms a thin shell or scale, about the eighth of an inch in diameter. On the 19th of October, on examining the scale, he found 26 caterpillars existing, which he was persuaded had never left their abode, as at that time all the parts were completely shut up, and, indeed, the edges of the scale were fast cemented to the branch. He thinks it probable that they may derive some little support from the sap of the branch under the shell or covering where they reside ; but it is quite clear that they never emerge from their birth-place to obtain food, or form any additional residence, till they are influenced by the warmth in the following spring. Mr. Lewis takes up the observation where it had been left by Mr. Major, and states that, about the time that the trees are coming into leaf, the caterpillars make their escape ; but they do not commence spinning webs immediately ; they cannot yet eat the epidermis of the leaves, and they require some protection from the cold and rain which their tender frames are not yet fitted to endure :

to effect this they mine into the leaves, eating the cellular tissue only, and leaving the epidermis untouched. Having acquired sufficient strength to withstand the vicissitudes of the atmosphere, and to devour the epidermis of the leaves, they make their way out ; and the anxious gardener, who has hitherto only observed the brownness of the leaves caused by the mining, but which is by him attributed to the withering blast of an easterly wind, is astonished when he perceives myriads of caterpillars swarming on his trees, and proceeding with alarming rapidity in their devastating course. The fact of their mining sufficiently explains the reason of their sudden appearance : it shows how one day not a single caterpillar may be visible on the trees, and the next they may be swarming with larvæ of so large a size as to rebut the idea of their having been recently hatched. For the destruction of these insects, various plans have been recommended. Mr. Major says that nothing more is required than the application of strong soap-suds forcibly applied with the engine, so as to break the web, that the suds may reach the insects. Where the trees are not much infested, gather the webs, including the caterpillars, by hand, and destroy them in any way most convenient. Care should, however, in these cases, be taken to kill, and not merely to disturb, the caterpillars. Mr. Lewis suggests the picking off and burning of the leaves whilst the cater-

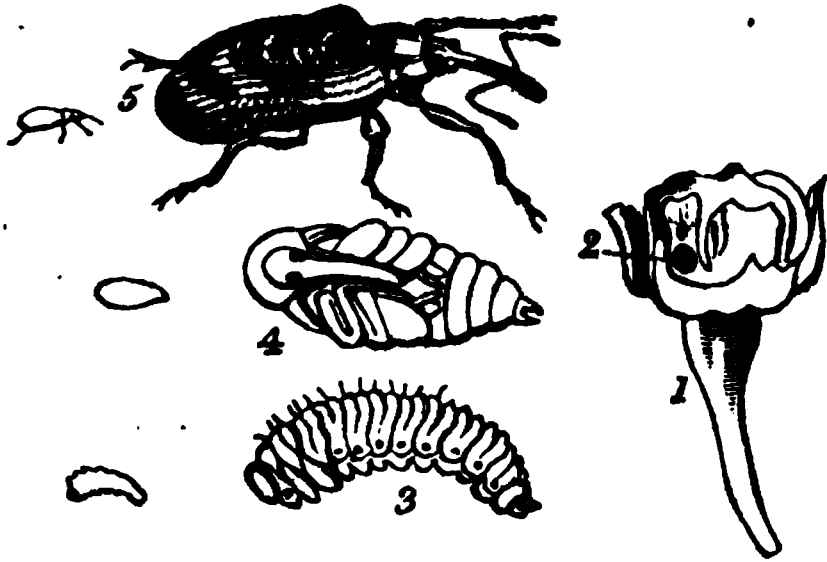
pillars are in the mining state; the presence of the insects being indicated by the blighted outward appearance of the leaf: but prevention is always better than cure, and it seems to us easier, as well as more advantageous, to destroy the moths as soon as they are produced, and before they have had time to deposit their eggs. The generally simultaneous appearance of the entire brood in the winged state, together with the very conspicuous appearance of the moth, will render this a matter of great facility. A sheet may be laid beneath the branches in the daytime, which should then be sharply struck with a stick; when the moths, which at that time are sluggish, will fall into the sheet, and may easily be destroyed: and the destruction of one moth will thus prevent the injuries arising from one, if not several, colonies of caterpillars in the following season. (*Gard. Mag.* iii. 435, N.S.)

THE APPLE-BLOSSOM WEEVIL (*Anthonomus Pomorum*).—In apple-buds attacked by this pest the petals form globes, which assume a rusty colour. On opening one, the stamina and germen are found entirely consumed, the withered petals forming a hollow globe (fig. 1), within which lying a brown pupa. About the middle of June the apple weevils hatch, and on examining the buds a hole is found on one side, from whence the beetles escape from their

tombs (fig. 2). In some seasons the larvæ are feeding the beginning of May, and the beetles have hatched by the 25th. These little animals sometimes occasion great loss to the apple-grower, especially in cider countries in backward seasons, when vegetation is retarded by cold and wet, which afford the beetles a much longer period to perform their operations. Like many other insects in their perfect state, they live through the winter, secreting themselves in the chinks and under the loose bark of trees, beneath stones, clods of earth, &c. In March, when the flower-buds are swelling, the beetles emerge from their retreats, when the males are seen in sunny mornings flying amongst the trees in search of the females, who generally are crawling over the branches, although they are also furnished with wings. They seem to be very careful in selecting proper objects for the reception of their eggs, and on finding a suitable bud, the female bores a hole with her minute jaws, which are placed at the tip of the slender proboscis, until she has reached the parts of fructification, and turning round she lays an egg in the hole by inserting her ovipositor, and then closes it again with her mouth, and seems as if she were forcing in the egg; this is rather a tedious operation, and is said to occupy three-quarters of an hour; she then hastens to another swelling flower-bud for the same purpose, and is thus employed two or three weeks, viz., until the flowers

begin to expand, when her labours cease ; for, as the larvæ can neither bear wet nor sunshine, they require the protection afforded by the closed petals. The eggs are hatching from the beginning to the end of April, principally influenced by the variations of the season ; if the weather be warm, they are matured in five or six days. During this period the bud grows and the petals of their usual rosy colour, but instead of expanding, they wither, and eventually turn to a rusty brown, and on opening them, in place of the germen and stamina, which have been consumed by a single maggot, one finds rolling about in this globular chamber a pupæ, of a deep ferruginous colour, which is very sensitive and restless when touched (fig. 4). The maggots are curved, fleshy, and whitish, having numerous segments and wrinkles, with a few short hairs, but no legs ; the head is horny and black, and furnished with small jaws (fig. 3). The exact time they remain in the pupæ state has not been ascertained, but in about a month from the period when the eggs are deposited, the weevils hatch, and eating a hole through the dry petals, they disperse over the tree, and feed upon the leaves during the remainder of the summer. Like most of the Curculionidæ when approached, the apple-weevils contract their eggs and fall down, so that it is difficult to detect and capture them in any numbers, except whilst they are pairing,

or when the females are engaged in depositing their eggs.



The apple-blossom weevil was named by Linnæus *Curculio pomorum*; and it has been distinguished by later naturalists as the *Anthonomus pomorum* (fig. 5). It is long and pear-shaped, of a reddish-brown colour, punctured, and clothed with short, depressed, whitish and ochreous hairs; the rostrum is long, subcylindrical, curved and sculptured; towards the apex are placed the antennæ, which are slender and geniculated; the basal joint is very long, slender and clavate—the second is oblong, the six following are more or less globose, and the remaining four form an oval-conical club; the head is subglobose, with two very prominent little black eyes; the thorax is semi-ovate, truncated before with three indistinct stripes of a paler colour; the scutellum forms a white dot; the elytra are elongate-ovate, with nine punctured striæ on each; beyond the middle is a large piceous lunar

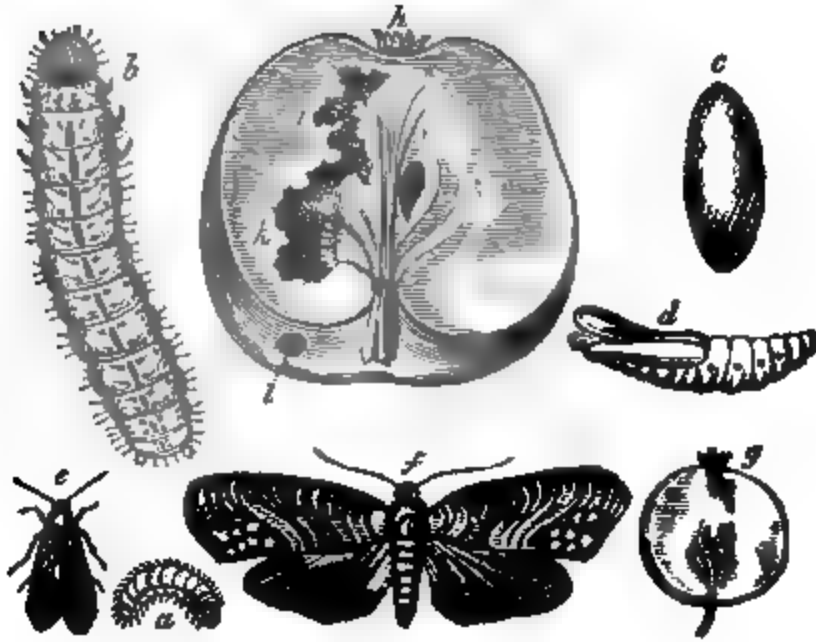
patch, bearing a pale oblique stripe across the centre, forming an angle at the suture; and towards the apex are two ochreous spots; wings very ample; legs moderately long and ferruginous; anterior thighs stout, with a strong tooth beneath—the others are similar, but smaller; the anterior tibiæ are sinuated internally, and they are all terminated by a claw; the tarsi are 4-jointed, the third joint being bilobed, the fourth furnished with minute claws. The smaller figures denote the natural sizes of the animals.

These beetles will also lay their eggs in the flower-buds of pear-trees, and it is on calm days the females are occupied in depositing them; for in windy or frosty weather they retire to sheltered situations. In genial springs, when the blossoms open in a week or ten days, these weevils do little mischief; but in cold, damp seasons, when the buds are three weeks or more in expanding, scarcely an apple-blossom sometimes escapes. The best mode of destroying them is to gather the punctured withered flower-buds and burn them, by which means the larvæ and pupæ will be cut off, and the beetles may be collected by beating the branches over a net; but unless this is done as soon as they make their appearance, it will not be of much service, as the eggs will have been deposited. From various statements it seems that the females will not readily fly, and, as they crawl up the trees, their incursions may be stopped, and the crops saved,

by winding tarred bandages round the upper portion of the trunks. (*Gard. Chron.* 1844, 555.)

THE APPLE OR CODLING MOTH (*Carpocapsa pomonella*).—It is only upon the pulpy parts of the apple (*h*, *i*) that the larva (*k*) of the apple moth feeds during the greater part of its growth: when, however, it has nearly attained its full size, it begins to feed on the pips of the apple, which, thus attacked in its most vital part, soon falls to the ground. The caterpillar, however, has now ceased feeding: it has other operations to undergo; and no sooner is the apple fallen to the ground, than it quits the fruit by the passage (*l*) which it had previously gnawed, and thus all traces of its steps are lost to the inquirer. A hundred apples may be opened, and not more than two or three larvæ observed within them; the orifice by which they have escaped being open, and not concealed by a little mass of brown grains, which is the case with those apples from which the larvæ has not made its escape. These little grains are the excrement of the larvæ, which are also to be seen in the burrows formed by them within the apple, and which are protruded through the hole previously made in the circumference of the fruit, being attached together by slender threads spun by the caterpillar. When, therefore, the larvæ makes its escape, it clears away the mass of dry excrementitious matter at the orifice

of the burrow, through which it escapes to the earth. Reaumur considers that the attaching of the pellets



of excrement together, and to the sides of the fruit, by means of a thin web, has for its object the removal of the annoyance which the larvæ would experience by these little masses being loose, and striking against it every time the apple was shaken by the wind.

One of these larvæ is represented of the natural size at *a*, and highly magnified at *b*. It is of a dirty white colour, with a brown head, varied with darkish brown marks. The body is slightly hairy; the prothorax, or first segment after the head, is whitish, with minute brown spots; the other segments are of a pale colour, with about eight small tubercles

on each; each of the three anterior segments is furnished with a pair of legs; there are also two small fleshy tubercles on each of the 6th, 7th, 8th and 9th segments, as well as a pair of feet at the extremity of the body. This description was made when the larvæ had for some time quitted the fruit. In its early state, it is of a dirty reddish or flesh colour. After quitting the fruit, the larvæ crept to the top of the box in which it was confined, and spun for itself a thin but close web, of a darkish-coloured silk (c), in which it remained all the winter, and for several of the early months of the following year, without assuming the chrysalis state. The caterpillar wanders about on the ground till it finds the stem of a tree, up which it climbs, and hides itself in some little crack of the bark. The fall of the apple, the exit of the grub, and its wandering to this place of safety, usually take place in the night-time. In this situation it remains without stirring for a day or two, as if to rest itself after the uncommon fatigue of a two yards' march; it then gnaws away the bark a little, in order to get in further, out of the way of observation, and having made a smooth chamber, big enough for its wants, it spins a beautiful little milk-white silken case, in which, after a few weeks, it becomes a chrysalis; and in this state it remains through the winter, and until the following June, when it is upon

the wing, and hovering round the young apples on a midsummer evening. (*Ent. Mag.* i., p. 146.)

Our specimens did not appear in the winged state until July, in the following year; and Reaumur says that his specimens assumed the perfect state on the 15th of August, having been only a month from the time of their quitting the apples. The chrysalis (*a*, magnified, after the escape of the insect,) is of a pale brown, with the dorsal surface of the abdominal segments armed with two transverse rows of fine teeth, like those of the chrysalis of the rose-moth, which are employed in extricating itself from the cocoon.

The moth itself (*e*, of the natural size; and *f*, magnified) is a very beautiful insect, about three-quarters of an inch in expanse, of which the following is the description:—Anterior wings ashy-brown, with very numerous, rather obscure, darker, transverse streaks, united into a broadish fascia towards the base; on the anal angle is a large blind subocellated spot, of which the margins are of a coppery or reddish golden colour: posterior wings black, darkish at the apex. (*Stephens*, loc. cit., p. 119.) By whom it is stated that it is not very abundant, but is found in gardens within the metropolitan district occasionally, in some plenty. About three years previously he found several in his garden; and in 1834 it was again in plenty.

We were not fortunate enough to observe the deposition of the eggs by the female moth, and, anxious to obtain the manner in which the larvæ commenced its attacks upon the fruit, and thereby of gaining an idea of the situation in which the eggs are placed, we opened a number of young apples at the beginning of August, and found the larvæ in a young state, in the upper part of the fruit, at a small distance from the eye (*g*), its presence being indicated by the dried powder in the centre of the eye, the head of the larvæ being turned towards the heart of the fruit. Rusticus, however, states that the moth may be observed, about the middle of June, hovering around the young apples, which by that time are fit for the reception of its eggs, which it lays in the eyes, one only in each, by introducing its long ovipositor between the leaves of the calyx, which form a tent above it that effectually shields it from the inclemency of the weather, or any other casualty. As soon as the egg is hatched, the little grub gnaws a hole in the crown of the apple, and soon buries itself in its substance; and it is worthy of remark, that the rind of the apple, as if to afford every facility to the destroyer, is thinner here than in any other part, and consequently more easily pierced. The apple most commonly attacked is the Codling, which ripens in July and August.

It will be evident, from the preceding detail of the habits of this moth, that there are considerable dif-

difficulties in the way of its extirpation. It is impossible, for instance, to be aware of the presence of the enemy within the fruit, until the mischief is actually completed; and, in like manner, the destruction of the moth, from its small size, and its habit of secreting itself in crevices of the bark, &c., is equally impracticable. The gathering up of the worm-eaten apples immediately after their fall, and before the enclosed caterpillar has had time to make its escape, cannot but be attended with good effect; care, however, must be taken, either by bruising the apples, or some other similar proceeding, to destroy the larva, which would otherwise very speedily make their escape, and so frustrate the pains taken for their destruction. It has also been suggested, that, by burning weeds in the garden or orchard at the time of the year when the insect is ready to deposit its eggs, the moth will be effectually driven away. (*Gard. Mag.* iv. 235, N.S.)

THE APPLE-TREE MUSSEL SCALE, OR DRY SCALE (*Aspidiotus conchiformis*).—Upon the trunks and branches of apple and pear-trees there are found two species of scale-insects, the former of which we will now describe and figure. They are so small, and partake so completely of the substance, colour, and character of the bark, that an unpractised eye would not suspect they were the production and habitation of an insect; and some allied species attached to the

ash and other trees have been mistaken, even by philosophers, for lichens, &c.

The little animals sticking to the bark of the apple-trees are so similar to mussel-shells, that Geoffroy called them "*Le Kermes en ecaille de moule*," but instead of giving them an appropriate scientific name, he designated them as the *Chermes arborum-linearis*. Gmelin has in some measure supplied the deficiency, by describing them under the name of *Coccus conchiformis*; but if he had applied the term of *Mytiliformis*, mussel-shaped, it would have been more significant. These scales do not lie in one direction, as others generally do, with their heads downward, for some of the apple-tree scales are placed vertically, others obliquely, and many have a transverse direction (fig. 1); and sometimes they are crowded together in immense multitudes in every possible position, even lying one over another. The scales are hard, dark, and shining; they are exceedingly like a minute mussel-shell, but rather more elongated; they are slightly curved, transversely wrinkled, rounded at the tail, and attenuated at the head, which is semi-cylindric, less opaque, and of a rusty colour (fig. 2). These adhere firmly to the bark, having the margins broad beneath and woolly (fig. 3), and when dislodged, the space they had covered appears white. Within the shell is found a fleshy-green female, occupying part of the cavity towards the tapering extremity (fig. 4),

the hinder space being entirely filled with white oval eggs, amounting sometimes to 50 or more, (fig. 5); they are rather larger than in most species, and produce little white flat cocci, with two antennæ and six legs; they are lively, and run about for several days, but having fixed themselves, then grow, and by degrees become very different creatures to what they were immediately after their birth.

On opening the scale, and taking out the female, it will be found that she is not attached to the shield, and that consequently this mussel-scale is not a true coccus, but an *aspidietus*: it is a fat yellowish green maggot, nearly orbicular, very convex, shining, with distinct transverse stride, indicating the abdominal segment; a pale brown line visible down the back, from the alimentary canal, shining through the thin and transparent skin (fig. 6).

A contributor to the *Gardener's Magazine* says, "A scale of a brown colour, pointed at both ends, and less than half the size of a seed of common flax, abounds in the north of Cambridgeshire, on the branchlets of old apple-trees; and in unlading the trees in autumn of their ruddy riches, here and there an apple occurs to whose rind one or more of these scales firmly adhere, and where it must have become fixed before the apple's growth was finished; as, when the scale is removed, a slight depression in the rind of the apple is perceptible." The same scale, it

is said, is very prevalent in Cheshire on the pear-trees, where it is considered to be injurious to the fruit, as, by clinging to the rind, it prevents the fruit from swelling to its full size. It is asserted that peaches, apricots, plums, &c., suffer from the attacks of the mussel-scale; and if young Ribston Pippins and some varieties of pears be planted near any other apple or pear-tree that already supports these insects, they will speedily migrate to them. The same observer says, "I believe this disease is mostly, if not entirely, confined to wall-fruit in the open air, standards not affording them sufficient warmth and shelter during our winters in Scotland, where they have been very abundant and very troublesome. They attach themselves to the bark, and by means of their rostrum they soon exhaust a branch so completely of its sap that it withers and dies." Mr. Ingpen recommends "two or three applications in the spring, at



intervals of one or two weeks, of strong lime-water with a brush, and a dusting of quicklime before the branches get dry ; or a washing of soft-soap and water, using also the powdered lime," which is perfectly harmless to vegetable life.

Although it is generally trained trees that are most attacked by the mussel-scales, standards are often so covered with them that they are completely hide-bound. The best plan for getting rid of these scales is to scrape the bark with a wooden knife, so as to bruise and crush the females without lacerating the tree, and immediately to wash over the trunk and branches with some gas-tar. If any other season should be preferred, the best season for applying it will be in May, when the young ones are creeping from under the scales, and are easily destroyed ; but they are so minute that it will be necessary to use a magnifying glass to ascertain when they are hatched and in motion. (*Gard. Chron.* 1843, 735.)

APPLE CHERMES (*Psylla mali*).—This insect is closely allied to the aphis, and is thus described in M. Kollar's too-much neglected work on "Insects injurious to Gardeners." It usually appears in June. In September, the apple chermes pair, and lay their eggs : they are white, and pointed at both ends, a line and a half long, and the fourth of a line thick, and become yellow before the young escape. The

apple chermes lays its eggs in different places of the twigs of an apple-tree ; usually, however, in the furrows of the knots, and sometimes in a regular manner. The larvæ were scarcely escaped from the egg, in the open air, when they hastened to the nearest bud, and began to gnaw its scales, because the bud was only somewhat swollen; and had not begun to sprout. On the second day after their birth they cast their first skin, after which they appeared nearly of their former shape and colour. The second changing of the skin can sometimes be scarcely seen at all, because the larva not only puts out a thicker string with the tubercle, but also an immense number of very fine entangled threads or small hairs, which it turns upwards over its back, and with them entirely covers its body and head. In sunshine, these strings look transparent, as if they were made of glass, and become of a greenish variable colour. Under this screen the chermes are secured from every attack of other insects ; for no ants, mites, or bugs can disturb them in their fortification, or consume them as their prey. After changing the second skin, the young assumed a different colour and form : they now became light green all over ; the abdomen was much broader than the thorax, and, on the side of the latter, rudiments of the wings were distinctly seen. The third time of changing the skin comes on in about eight days, sometimes sooner and sometimes

later, according to the weather. After this skin the wing rudiments very distinctly make their appearance, and become larger and whiter the nearer the insect approaches to the perfect state. The body is also of a light green, and the larvæ have black eyes and blackish antennæ. At last the time arrives when the insect assumes the perfect state ; when it retires to a part of a leaf which it had selected, and after having firmly fixed itself there, the back splits open, and the beautiful winged chermes appears from the nymph. The back of the thorax is of a light green, the abdomen is marked with yellow wings, and the membranous wings with strongly-marked veins.

APPLE-BARK BEETLE (*Bostrychus dispar*), fortunately, appears in England very rarely. The female of this species bores into the wood of the apple-tree, depositing there her eggs, usually, in the month of May. Its perforations, in Germany, are so numerous and extensive as frequently to destroy the tree. The perforations are confined to the alburnum of the wood.

SMALL-BARK BEETLE (*Scolytus hæmorrhous*).—This is of still more rare occurrence than the preceding. It is black, and the ends of the wing-cases reddish ; feet brownish red ; wing-cases furrowed longitudinally, and distinctly spotted. The insect is very small, the largest being no more than three-fourths

of a line in length. The female deposits its eggs in furrows made in the inner bark and alburnum. Schmidberger saw reason to conclude that this insect only attacks sickly trees. It commences its boring in May, and the larvæ continue feeding until late in the autumn.

AMERICAN BLIGHT (*Eriosoma lanigera*—*Aphis lanigera*).—We have glanced at the history of this comparatively recent plague of our apple-trees, and have but little to add to that narrative. Above all the insects infesting the apple-tree this is the most prejudicial. Some fifteen years since, we purchased a lot of Crabstocks from an eminent nurseryman for grafting on ; up to that period we had not an individual of this species in the gardens. The unlucky Crabs were infested with it, as indeed were all the apples and stocks in the above nursery ; and from them it took to the apples of the kitchen-garden, and, in spite of numerous dressings, we have never been able to get completely rid of it to this day.

Before proceeding to enumerate the various remedies which have been suggested, we will particularize a little more fully the phenomena attendant upon the appearance of this insect. The cottony matter appearing in the cracks and excrescences of apple-tree branches in the spring envelopes colonies of this insect, and which, when crushed, exude a reddish fluid.

These insects are injurious by piercing the sap vessels with their probosces, sucking the juice of the tree, and causing wounds which ulcerate and finally destroy the branch attacked by corroding through all the sap vessels. The excrescences or knobs attendant upon the attacks of these insects are really caused by the efforts of the tree to repair the injuries. The cottony matter is abundant, and, wafted to other trees, probably conveys to them infection, by bearing with it the eggs or embryo insect. But this is not the exclusive mode of diffusing the disease, for although the females are usually wingless, yet, like many other insects, some are probably produced with wings at the season propitious to colonization. The males are uniformly winged. In the winter these insects retire underground, and prey upon the roots of the apple-tree. A tree thus ravaged at all seasons will soon be killed, if prompt and vigorous remedies are not adopted. The affected roots may be bared and left exposed for a few days to the cold, and the earth, before returned, be saturated with ammoniacal liquor from the gas works. In early March the branches should be scraped, and scrubbed with the same ammoniacal liquid, or a strong brine of common salt; but whatever liquid is employed, the scraping and hard bristles of the brush should penetrate every crack in the bark. This treatment, repeated and persevered in so long as the least appearance of the insect is observed, never fails of a

cure. Linseed, or rape oil, or spirit of tar, applied to the infected part, and repeated a second or third time with a brush, are also effective remedies. They suffocate the insects. Strong pyroligneous acid applied in the same mode is also said to destroy this as well as the scale insect. The Codlin and Juneating are particularly liable to be infected; but we never observed it upon any of the russet apples; and the Crofton pippin is also said to be exempted.

Painting over every patch of this insect with hot glue; dabbing them with a mixture of oil of vitriol and water (1 ounce of the first to 7 of the latter) are also said to be effectual modes of destroying these pests.

We were long since perfectly aware that train oil would destroy it, but we have little faith in using materials which have a tendency to close the pores of the tree. We have, therefore, tried various recipes, and we think that urine and soft-soap water in combination are the best. We beat up four ounces of the soap to a gallon, and blend this with an equal portion of urine; and beat up as much clay into the whole as will produce a thick paint; sometimes we add a little sulphur. This mixture is rubbed well into every crevice directly the leaves are fallen, and wherever it comes in contact with the insect this is destroyed. The most difficult part of the affair, however, is to touch them all, the stems possessing so many crevices. It is well to add some lime to the mixture; by this

means we can readily discern, under a dry state of atmosphere, what parts have been missed in the first dressing, and apply a second accordingly.

THE RED SPIDER (*Acarus tellarius*) is a great pest to the apple in dry summers, and on hot soils. Water and sulphur are the best remedies. A liberal watering of manure-water at the root, and a thorough dusting of sulphur on the back of the leaves, will soon subdue them.

USES.

THE apple-tree is cultivated chiefly for its fruit, but this is not the only part that is valuable to man.

The wood of the wild apple is tolerably hard : it turns very clean ; and when made into cogs for wheels, acquires a polish, and lasts a long time. The bark of the apple-tree affords a yellow dye, and the acid juice of the crab-apple is called verjuice, forming a harsh, austere vinegar.

The apple-tree, however, is most extensively cultivated for the purpose of converting the juice of its fruit into *cider*. In previous sections we have entered into details pointing out the varieties best suited for making this truly English liquor, and the mode best suited to their cultivation, and it now only remains for us to

give a slight sketch of its manufacture and of the different qualities.

Cider is manufactured with very rude machinery, by the following process. The apples are thrown into a circular stone trough, usually about 18 feet in diameter, called the chase, round which the runner, a heavy circular stone, is turned by one or sometimes two horses. When the fruit has been ground until the rind and the core are so completely reduced that a handful of "must," when squeezed, will all pass without lumps between the fingers, and the maker sees from the white spots that are in it that the pips have been broken, a square horse-hair cloth is spread under a screw-press, and some of the must is poured with pails upon the hair, the edges and corners of which are folded inwards so as to prevent its escape. Ten or twelve of these hairs are piled and filled one upon the other, and then surmounted with a frame of thick boards. Upon this the screw is slowly worked down by a lever; and with the pressure, a thick brown juice exudes from the hairs, leaving within them only a dry residue, which, in years when apples are scarce, is sometimes mixed with water, ground again, and the liquid pressed out as before. This latter product is called 'water cider,' a thin unpalatable liquor, which is given to the labourers early in the year. The cider is received by a channel in the frame of the press upon which the hairs stand, emptying into a flat tub called

a 'trin.' From the trin it is poured with buckets or 'racking cans' into casks, placed either out of doors or in sheds where there is a free current of air. In about three or four days, more or less according to the heat of the weather, the liquor usually will ferment; the thick heavier parts will subside as a sediment at the bottom of the cask, and the lighter become bright clear cider. This should then be 'racked' or drawn off into another cask, and the sediment be put to strain through linen bags, and what oozes from them should be restored.

It is during the fermentation that the management of cider is least understood, and that there is the greatest hazard of injury. It is necessary also to know what fruit will by itself make good cider, which kinds should be ground together, and what proportions should be mixed. But it is in the preservation of strength and flavour after the cider is ground that the principal difficulty consists: *slight* fermentation will leave the liquor thick and unpalatable; *rapid* fermentation will impair both its strength and durability; *excessive* fermentation will make it sour, harsh, and thin. Other things being equal, that cider will probably prove the best in which the vinous fermentation has proceeded slowly, and has not been confounded with the acetous. The remedies used in cases of cider not clearing are either yeast or the addition of cider in a state of fermentation, isinglass, eggs, or a quart

of fresh blood stirred up with the liquor; in which last case it is to be racked on the following day. These do not always prove effectual. But the common evils are excess or rapidity of fermentation; and if a better quality than farm-house or 'family drink' is sought, cider requires so much care to prevent its being spoiled, that the best and most careful makers frequently have it looked at during each night for some weeks after it is made; and if the bubbling hissing noise, the sign of fermentation, becomes frequent or too loud, the liquor is immediately racked off into another cask: this check often requires to be repeated several times; but although at each racking some portion of the strength will be lost, the body, flavour, and sweetness will chiefly be retained. It is not the habit of the farmer to add sugar, treacle, brandy, or any colouring matter to the liquor; it is only adulterated in the hands of cider dealers and publicans, who will not lose a hogshead; and if one has turned sour, or has been otherwise damaged, it must be 'doctored,' in order to render it marketable.

At the beginning of January the cider is moved into cellars, where, by large growers, it is frequently stored in casks of great capacity, containing 1000, 1500, or even 2000 gallons; these are cheaper in proportion than smaller vessels, and are thought to preserve the cider better. In March the liquor is bunged down; it is then fit for sale, and may be used soon

afterwards, though it will greatly improve by keeping. If bottled cider is required, it should be bottled and wired in the September or October after it is made ; some persons prefer an earlier time, the end of April or the beginning of May ; a greater degree of effervescence is thus attained, but a considerable loss occurs from the number of bottles that will burst.

The strongest ciders are made from fruits which possess some degree of astringency ; and this quality is so necessary in the pear, that we have never known a single instance in which perry, made from fruits that were without astringency, did not become sour before the middle of the succeeding summer. It may be preserved by a mixture of the harsh juice of the crab, and this is effected more by the astringent than by the saccharine matter the latter contains.

The merit of cider will always depend much on the proper mixture, or rather on the proper separation of the fruits. Those whose rind and pulp are tinged with green, or red, without the mixture of yellow, (for that colour will disappear in the first stages of fermentation,) should be carefully kept apart from such as are yellow, or yellow intermixed with red. The latter kinds, which should remain on the tree till ripe enough to fall without being much shaken, are alone capable of making fine cider. Each kind should be collected separately, and kept till it becomes perfectly mellow. For this purpose, in the common

practice of the country, it is placed in heaps of ten inches or a foot thick, and exposed to the sun and air, and rain ; not being ever covered except in very severe frosts. The strength and flavour of the future liquor are, however, increased by keeping the fruit under cover some time before it is ground ; but unless a situation can be afforded it, in which it is exposed to a free current of air, and where it can be spread very thin, it is apt to contract an unpleasant smell, which will much affect the cider produced from it. Few farms are provided with proper buildings for this purpose on a large scale, and the improvement of the liquor will not nearly pay the expense of erecting them. It may reasonably be supposed that much water is absorbed by the fruit in a rainy season, but the quantity of juice yielded by any given quantity of fruit will be found to diminish, as the fruit becomes more mellow, even in very wet weather, provided it be ground when thoroughly dry ; and we are not quite satisfied that the apple does not receive benefit from the sun and light, subsequently to its being taken from the tree. The advantages therefore of covering the fruit will, probably, be much less than may at first sight be expected. No criterion appears to be known by which the most proper point of maturity in the fruit can be ascertained with accuracy, but we have good reason to believe that it improves, as long as it continues to acquire a deeper shade of yellow, without

decaying. Each heap should be examined prior to its being ground, and any decayed or green fruit carefully taken away. The expense of this will be very small, and will be amply repaid by the excellence of the liquor, and the ease with which too great a degree of fermentation will be prevented. Each kind of fruit should either be ground separately, or mixed with such only as becomes ripe precisely at the same time; but it is from the former practice that fine ciders, of different flavours and degrees of strength, are best obtained from the same orchard. The practice of mixing different varieties of fruit will, however, often be found eligible; for it is much more easy to find the requisite quantities of richness, astringency, and flavour, in three varieties of fruit, than in one; and hence ciders, composed of the juice of mixed fruits, are generally found to succeed with greater certainty than those made with any one kind. By mixtures, also, the cider-maker, being able to give to each cask a less portion of acid or astringency, may best accommodate different portions of his liquor to different palates and constitutions. (*Knight on the Apple*, 107.)

In 1830 the tax upon cider, of ten shillings a barrel, was taken off (*M'Culloch, Dic. Com.*), and in the same year an Act was passed allowing any person to sell cider upon the payment of £2 2s annually for a license from the Excise. This act was amended in 1834, and a license for the sale of cider was in 1836

granted by the Excise to an application signed by six ratepayers of the applicant's parish, the payment being £3 3s if the liquor is to be drunk on the premises, £1 1s if it is not. These alterations have necessarily added greatly to the consumption ; but the increase of orchards during the last twenty years, and the late productive seasons, have fully supplied the demand. During the years 1833-4-5 the price in the hands of the grower may be thus estimated :— Of the best cider, from 1s to 1s 6d per gallon ; good, from 10d to 1s per gallon ; family cider, used by farmers and in public-houses, from 4d to 10d per gallon ; ' drink ' for labourers, from 2½d to 6d per gallon. These prices amply remunerated the farmer, who, in many instances, might increase his profits by a diminution of the cost of production. It cannot certainly be supposed that small growers can go to the expense of procuring much machinery ; nevertheless the extreme clumsiness of the present wasteful system would fully warrant larger owners in erecting suitable buildings and apparatus. It is true that some improvements have been made, that larger mills are used, that in the press an easily-worked iron screw has been substituted for an awkward wooden one ; but far more remains to be effected. If the mill was placed upon a first floor, which could easily be done in a building erected against a bank, or having an inclined plane, so that horses might enter at that height,

all lifting of the cider from the trin might be saved, as a pipe might be carried from the press into casks in the cellars underneath. Again, if the casks in the cellars were placed upon stages, manual labour in racking might be dispensed with, and waste from spilling saved, since a pipe from a hogshead upon a high stage would empty the liquor into a cask on a lower. No use, again, is made of the siphon, a cheap instrument within the reach of any farmer's purse, which would no doubt be serviceable and economical.

The quantity consumed by workmen is very large ; two or three quarts a day is the usual allowance given in Herefordshire by masters ; and in harvest-time, many labourers drink in a day ten or twelve quarts of a liquor that in a stranger's mouth would be mistaken for vinegar ; they do not like sweet cider. Notwithstanding so great a quantity is consumed, there do not appear to be any diseases peculiar to, or very general in, cider countries ; idiocy and rheumatism have been stated to be very prevalent in such districts ; but even if this is true, cider-drinking has in no way proved to be the cause. It is remarkable that, during the continuance of the cholera in this kingdom, there occurred very few cases in Devonshire, and none in Herefordshire, although the sickness reached the adjoining counties at the time of harvest, when cider is drunk to excess.

Cider of good quality is made in Ireland, in the

counties of Waterford and Cork; in Normandy, whence we have many of our best apples; in Belgium; and of inferior quality in Germany. It is also made in abundance, and of excellent quality, in many parts of the United States. (*Penny Cyclopædia.*)

Preservation of Apples.—There are two things to be especially guarded against in the fruit store-room—putrefaction and excessive evaporation—for decay and shrivelling are almost equally obnoxious if present in fruit for the dessert.

We have already remarked upon the fitness of fruit for gathering, and of the precautions requisite to be observed in that process of harvesting; but we will observe, in addition, that two-thirds of the *early* apples should be gathered ten days before they are ripe, taking them carefully one by one, and placing them in a cool fruit-room; these will succeed those left to ripen on the trees. Look over these every morning, and pick out the best fruit for the day's consumption; if they do not ripen fast enough, remove a few occasionally to a warmer room or kitchen, where they will soon get mellow enough. Those for kitchen use should also be gathered before they are quite ripe, and the ripest of them may be selected for the daily consumption.

Cupboards or shelves in a dark, cold cellar are the best store places for apples. The shelves, having a

rim about one inch in height all round, to prevent the apples tumbling off, about six inches apart, and made to slide in and out for the convenience of sorting. The apples must be placed so as not to touch each other, and rest on the eye; if left a month in this way without looking at them, and although during that time one or two may have shewn symptoms of decay, the contagion will not spread in the same manner that it does when they are packed in layers with straw in open frames, or exposed to the light without any covering. (*Gard. Chron.* 1843, 336.)

We were of opinion, at one time, that dryness was an essential for the long preservation of apples from decay, but later experience and observation has led to a contrary conviction. Apples that have remained, accidentally, in tufts of box edgings, exposed to all the wet and vicissitudes of winter, have been found in the spring following as plump and sound as when they first fell from the tree, whereas those in the store-room were then either shrivelled or entirely decayed.

Mr. C. Diplock, gardener at Heath Lane Lodge, Twickenham, has made the following observations upon this point:—Apples do not require to be kept so dry and warm as many people imagine; and if kept very dry, you can never keep apples till January without shrivelling. Mr. Diplock had two casks made air-tight—one filled with apples put in dry sand; the other filled with apples wrapped separately

in paper ; and the heads of the casks put in and made secure with plaster-of-Paris. When opened in March every apple was quite rotten. Apples always perspire more or less, and a little air now and then is useful, and helps to preserve them ; but they should on no account be handled in frosty weather. It is thought by most gardeners that apples will not keep unless gathered when dry ; but about eight years ago, during a wet season, he had a large quantity gathered when it rained hard—laid them on a floor which was covered with straw ; the next day being fine, had more gathered in a dry state, which he laid near the others ; and found that both kept equally well ; for the wet ones soon became dry, and the others perspired. Since then he does not mind their being gathered wet, nor does he wait till the dew gets off before he gathers them. Of course he prefers gathering when the trees are dry. (*Gard. Chron.* 1842, 588.)

Mr. C. Harrison, F.H.S., has some remarks all tending to prove that coldness rather than dryness is most essential for the preservation of this fruit. In winter, he says, if the weather is clear and frosty, the windows or ventilators should be kept open several hours each day ; but when the weather is damp, they are to be kept entirely shut ; and no fire should ever be used in the fruit-room, as it always causes a damp to arise, which does infinite injury to the fruit. Frost

does not materially affect apples, for apples completely frozen have kept equally well with the rest; but then no artificial means must be used to thaw the frost. After the first of March the fruit-room must be close shut up, for the admission of much air after that period causes the fruit to shrivel up and lose their colour; and they should be handled as little as possible after the month of May, nor should they ever be wiped until they are about to be used for the table, for they soon become unsound after being so treated. Apples will be found to keep better and much longer in this simple way than by the usual practice of covering with hay, straw, moss, or any thing else whatever; for fruit crowded together, or covered up with any material, will in a short time become heated, and deprived not only of its gloss and colour, but also of its flavour. In the way recommended above, the codlins and softer kinds of baking apples have kept good till the end of June, and the pippins, as well as various sorts of dessert apples, to the end of October, with their colour as fresh as when they were first gathered, and their flavour not in the least deteriorated. (*Gard. Mag.* iii. 10.)

Even though the apples are so placed as not to touch each other, yet it is very essential that all decaying ones should be removed as soon as observed, for it is well-known that all vegetable decomposition of this kind is attended by parasitical fungi, the mi-

nute seeds of which float to other apples in their vicinity, and thus hasten, if they do not instigate, their decay.

Mr. G. Fielder, gardener at Wadhurst Castle, is very decided upon this point. He says, one very essential thing in keeping apples is, that due attention be paid to picking out those which are rotten. Much fruit is saved by doing so ; and it is necessary that apples should have a general searching in order to be effectually cleared. It is useless where persons whenever they visit their fruit-room have been contented with picking out only such decayed ones as first presented themselves to sight ; as many still remain to contaminate those adjoining. (*Gard. Chron.* 1842, 638.)

Storing in Sand.—Apples placed in boxes or other enclosures in alternate layers with sand often will undoubtedly keep a length of time, but at others we have known them decay to a very serious extent ; and apples so kept are always deficient in flavour. The only mode of obviating the latter defect is to keep them for a fortnight before using on an open shelf.

Mr. J. Stewart, of Pinkie, gives the following directions for this mode of keeping. Some glazed earthen jars must be provided, with tops or covers ; and also a quantity of pure pit-sand, free of any mixture ; this is to be thoroughly dried on a flue. Then put a layer

of sand an inch thick on the bottom of the jar; above this a layer of fruit, a quarter of an inch free from any other. Cover the whole with sand to the depth of an inch; then lay a second stratum of fruit, covering again with an inch of sand, and proceed in this way till the whole be finished. An inch and a half of sand may be placed over the uppermost row of fruit. The jar is now to be closed and placed in a dry airy situation, as cool as possible, but entirely free from frost.

The usual time at which each kind of fruit ought to be fit for the table being known, the jars containing such fruit are to be examined, turning out the sand and fruit cautiously into a sieve. The ripe fruit may be laid in the shelves of the fruit-room for use, and the unripe is carefully to be replaced in the jars as before, but with fresh dried sand.

Some kinds of apples managed in this way, says Mr. Stewart, will keep till July. Pears will keep till April; the Toring till June. (*Caled. Hort. Mem.* i. 208.)

That dryness is not essential for the long keeping of apples is proved by the fact that in Herefordshire the practice is adopted by some parties of actually throwing water over the stored fruit. The practice of one orchardist is to cover the floor of his cellar with hurdles two in thickness, and on these to place a little straw, upon which the apples are placed with-

out further care or attention, except removing all that appear to be faulty as he brings them into the cellar ; and he thinks it unnecessary to use any particular care in this respect. He had at one time, one hundred and ten bushels thus heaped up in a small cellar, and two or three times each week he gave them a good wetting with fresh water, as much as he thought would well wet the whole of them. The water drains off, through the straw and hurdles, into a well. In this way, he stated that his apples keep well until the period at which he usually disposes of them—the best to make him a good return after Christmas. (*Gard. Chron.* 1842, 805.)

Other testimony, conclusive that moisture rather than dryness is essential to the keeping of apples in good order, is afforded by the numerous evidence we have that they keep superiorly if stored under a covering of earth, according to the mode in which potatoes are “hogged.” Mr. Marnock, Curator of the Botanic Garden, says, that by putting apples in pits in autumn, retaining them there through the winter, until taken up in March, they still retain the same degree of hardness as when pulled from the trees, which of course was not the case with those kept upon shelves. The following are the sorts which were kept in this way, and their condition when taken out : —The Ribston Pippin rotted one-tenth ; Red-streaks, three-fourths ; Flowery Town, one-sixth ; Royal Rus-

set, one-eighth ; Golden Pippin, one-sixth ; Mount House, one-tenth ; Red Robin, none. (*Gard. Mag.* iii. 284.)

Mr. R. Donald, of Woking Nursery, was still more successful in preserving his apples in this manner. He had a trench dug five feet wide, one foot below the surface of the ground, and 12 feet long ; covered the bottom and sides with turf, the grassy side upwards, and then filled the space with Golden Knobs and some French Crabs, about $2\frac{1}{2}$ feet deep in the centre, sloping a little to the side ; he then covered them close with turf, the grassy side next the fruit, to keep them clean, and had the ridge covered with mould a foot thick, to keep out the frost and exclude the external air. In the end of April following they were taken out in fine preservation. (*Gard. Mag.* i. 209.)

There are many modes of preserving apples in sugar, and by drying, known to every housewife, but the following very efficient and simple method is not so generally practised as it deserves.

Any good baking sort, which is liable to rot, if peeled and cut into slices about the thickness of one-sixth of an inch, and dried in the sun, or in a slow oven, till sufficiently desiccated, may be kept in boxes in a dry place for a considerable time ; and the slices only require to be soaked in water for an hour or two before using. (*Jour. of Science*, July 1827, 272.)

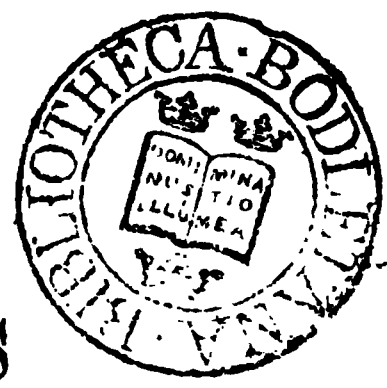
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— NUMBER ONE TWO

Christmas

SATURDAY 2ND

MEMORIAL ~~DAY~~ RDENER'S



Miss Ann Unwin's FIFTH ANNUAL VOLUME.

Refreshments.

8 p.m.—11.45

**THE CUCUMBER;
ITS CULTURE, USES, AND HISTORY.**

BY GEORGE W. JOHNSON,

**Editor of The Gardeners' Almanack, The Dictionary of Modern Gardening,
&c.**

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THE CUCUMBER.

HISTORY.

THE cucumber is one of our Kitchen Garden products earliest mentioned in history. It is, and always has been, a vegetable peculiarly refreshing and agreeable to the palates of natives of warm climates ; and it is among these that we first find it mentioned as a cultivated and coveted esculent. When wandering in the Wilderness more than thirty-three centuries ago (1490 B.C.), the ungrateful Israelites remembered with regret the cucumbers which they had enjoyed so abundantly when in Egypt. (*Numbers* xi. 5.) Cucumbers are still among the most extensively cultivated vegetables of that country ; and I have observed entire fields of them growing on the banks of the Ganges, in Hindostan. To guard them from depredation, a watchman was here placed in a reed hut ; and its isolated position most forcibly illustrated that other passage of Scripture in which this vegetable is mentioned, and where the prophet foreshadows the deserted state of Zion by comparing her to “ a lodge in a garden of cucumbers.” (*Isaiah* i. 8.)

Mountain, there are many good directions for the culture of cucumbers. He says they are best trained upon a trellis “that the fruites corrupt not by lying on the earth;” and gives some instructions as to the mode of keeping the plants well supplied with moisture by filtering, that is, by having worsted with one end in water and the other in the soil; says that plants raised from cuttings are soonest productive; but all his directions are mingled with many absurdities borrowed from classic authorities.

In Lyte’s “Herball,” published in 1578, the cucumber is described under the botanical names it still retains (*Cucumis sativus*), and as the *Melopepon* of Galen. He does not mention any varieties, and the drawing which he gives shews that the fruit must have been very short and prickly.

Gerarde, less than twenty years after, 1597, gives the following directions for its cultivation:—A hot-bed is to be made in the middle of April, or somewhat sooner, of stable-dung, an ell in breadth and depth, to be covered with hoops and poles; (for glasses were not then known); and at night, mats, old painted cloth, or straw, were to be thrown over it; the bed was to be covered with rich earth, finely sifted, half a foot thick: in this the seeds were to be sown; and the covering being put on, was to remain seven or eight days without being taken off: the plants being then come up, were to be watered in the

middle of the day with water that had stood in the house or in the sun ; the covering was to be put on every night, and taken off every day ; and when the plants had four or six leaves, and the danger of cold nights was past, they were to be replanted very curiously, with the earth sticking to them as near as may be, unto the most fruitful place, and where the sun had most force in the garden ; covering them with dock-leaves or wisps of straw, propping up with forked sticks, to keep them from the cold of the night and the heat of the sun. (*Gerarde's Herball*, 764.)

Gerarde mentions *Cucumis vulgaris*, the cucumber or cucumber, which is our short prickly cucumber, and *Cucumis ex Hispanico*, or Spanish cucumber. These are the only two kinds he describes ; for his *C. Turcicus*, *C. anguina*, and *C. pyriformis*, are mere gourds. His Spanish cucumber appears to be the first improved variety of which we have any notice. Gerard says of it, " There hath been, not long since, sent to Strasburgh, in Germany, out of Spain, some seeds of a rare and beautiful cucumber ; the fruit of a foot in length." He then gives directions for making a hotbed, which have been detailed : all which directions, he says, if followed, would enable the gardener to defy " the intemperancy of the climate although in the farthest parts of the north of Scotland." Gerard says that the cucumber, if eaten as a potage, made of it with mutton and oatmeal, fe

breakfast, dinner, and supper, for three weeks without intermission, it “doth perfectly cure all manner of sauce-phlegm and copper faces, red and shining fiery noses (as red as red roses), with pimples, pumples, rubies, and such like precious faces!”

In a few years subsequently glass began to be employed for the protection of the plants, though the ignorance under which gardeners laboured, as to the mode of forcing, was still extreme. Thus, Parkinson, in his “Paradisus,” published in 1627, although he directs the cucumber to be sown in a hotbed, it was not to be done until April, and the plants were to be removed to a rich soil, without bottom heat, and to be “covered with straw (some do use great hollow glasses, like unto bell heads) or some such other things, to defend them from cold and the heat of the sun, while young and new planted.” Of “cowcumbers” he enumerates six varieties, viz.:—1. The long green, much ribbed. 2. The short, of equal size throughout. 3. Long yellow, yellowish, 13 inches long, but “not the cucumis anguinis of the Latins.” 4. The French. 5. Dantzic, small, and imported in a pickled state. 6. Muscovy, smallest of all, “no bigger than small lemons.”

From bell glasses the transition to frames, and other more regular forcing structures, was easy and rapid, so that Switzer, writing in 1727, boasts, that cucumbers, which twenty-five years before were never
 en at table until the close of May, were then always

ready early in March, or even sooner if tried for. Mr. Fowler, gardener to Sir Nathaniel Gould, at Stoke Newington, was the most successful cultivator of the cucumber, and the first to raise plants in autumn for fruiting about Christmas; and he presented the king, George the 1st, with a brace of full-grown cucumbers, on the New Year's Day of 1721. (*Bradley's General Treatise on Husbandry*, ii. 61.)

The first separate treatise on the growth of the cucumber, with which I am acquainted, was published in 1717, by Samuel Collins, Esq., of Archester, in Northamptonshire, and is, in his work, entitled, "Paradise Retrieved." He then knew only three varieties, "the long smooth, the short prickly, and a particular kind, 15 inches long, scarce amongst us." His directions for their culture, under hand glasses and frames, are very full and correct.

Switzer alludes to there being, formerly, only three varieties of the cucumber, but adds, that in his time there were eight, and, with few exceptions, his directions for their culture in hotbeds is nearly as full and satisfactory as that now given by authorities a century later. Of course, improvements in the structure of the frames, and other appliances, have since been made, but his practice was, for the most part, very correct, and as his immediate successors were Fairchild and Miller, I have no need to trace the progress

of its culture further. Our present practice is only a modification of theirs.

Cucumbers are now very extensively cultivated for the public markets. In Hertfordshire and Bedfordshire many acres are annually devoted to their growth—the fruit to be gathered small for pickling—and the amount may be estimated from the fact stated by Mr. Loudon, that the village of Sandby, in the county last named, has been known, in one week, to furnish 10,000 bushels of gherkins.

BOTANICAL CHARACTERS.

THE cucumber (*Cucumis sativus*) is one of the species belonging to the Monoecia Monadelphica class and order of Linnæus, and of Cucurbitaceæ in the Natural System. It is a trailing annual.

Root, annual: *stems*, creeping, hispid, rough: *leaves*, heart-shaped, with sharp, projecting, terminating angles: *flowers*, yellow, axillary; germ oblong, obscurely angular, not hairy, but muricated with prickles springing from a smooth warty substance: *fruit*, elongated, almost cylindrical, obtuse at both ends; scabrous, with warts, yellowish, white, or green, in different varieties; rind thin, coriaceous; flesh spongy; primary cells three or four, each divided into two secondary cells, and then again into

the proper cells of the seed, filled with a pellucid jelly. Supposed to be a native of Tartary.

Upon the physiology of the cucumber I have only to observe, that in several instances I have noticed a remarkable difference in the number of tendrils produced by plants of the same variety, the long prickly, according to the situation in which they were grown. Those plants, the stems of which were allowed to trail along the surface of the soil, produced very few tendrils, and these in no one instance reached to any length. Other plants, from the same sowing, trained upon an inclined plain of hazel boughs, produced many more tendrils, and these grew to a far greater length and were of much service to the plants, in enabling them to cling to their more elevated position. This is only one of many instances of a wise provision and adaptation of the organs to circumstances. M. de Candolle thought, that the tendrils of the cucumber would have been stipules if circumstances required, but some observations of Dr. Bell Salter lead to the conclusion, that they would be leaves if the plants required a larger surface of foliage.

CHEMICAL COMPOSITION.

THE fruit of the cucumber has been analyzed by Dr.

John, who found it composed of the following ingredients :—

Water	97,13
Substance similar to fungin ..	0,53
Soluble vegetable albumen ..	0,13
Resin	0,04
Extractive with sugar ..	1,66
Mucus	0,5
Phosphate of lime..	
Phosphate of potash	
Phosphoric acid ..	
Ammoniacal salt ..	
A malate	
Sulphate of potash	
Muriate of potash..	
Phosphate of iron..	

(*Journ. de Physique*, xxix. 3.)

The fact of the cucumber containing a substance analogous to fungin, the constituent which imparts a poisonous quality to some of the mushroom tribe, is a sufficient explanation of the fact that this vegetable is so offensive to the stomachs of some persons.

VARIETIES.

THESE are numerous, and from time to time others are announced ; but let it not always be taken for granted that these are new or meritorious.

FOR OPEN-GROUND CULTIVATION

The following are well suited :—

Early short Prickly. Four inches long, green,

smooth, prickles black and few. Very hardy, and, when an early abundant crop is more considered than length or beauty of proportion, it may be selected as the best for winter forcing. Sometimes called the *Old Southgate*.

Early long Prickly. Best for summer crop. About six inches long, otherwise resembles the first-named. Both are good bearers.

Longest green Prickly. Differs from the preceding in being about nine inches long, and not an early bearer. The prickles are black, and very numerous.

Early green Cluster. Has its blossoms three or four together. Very early; five inches long; has many tendrils, which renders it easily trainable upon sticks or other treillage. Leaves small, and growth compact. The *Gherkin* is a name sometimes given this variety.

White Dutch Prickly. Early, and of peculiar agreeable flavour. Seeds few.

FOR FORCING UNDER FRAMES.

White Turkey, Green Turkey. These have straight smooth fruit, about 16 inches long. They have robust, large leaves, and are shy, very late bearers.

Green Roman. This, like the two preceding, has fruit destitute of prickles, and about the same length. It is a robust grower, but earlier than the Turkey.

Flanagan's. Length of fruit two feet ; very green ; black prickles ; crisp and good.

Nepaul. Has a very large fruit, 17 inches long and 8 inches in diameter. A native of Nepaul, unsightly for table, but good for stewing.

Duncan's Victoria. A seedling, named in honour of her Majesty ; is one of the finest. Colour, deep green. Set with spines to the shoulder, thick and black. Shoulder short. Fruit uniform and straight, growing to a great length. Mr. Duncan has had them 28 inches long ; 24 inches in nine days from setting ; and sometimes 4 inches long previously to the expansion of the bloom. It is a great bearer, but does not force so well as shorter kinds.

New Roman Emperor. Fruit, beautiful and excellent ; forces well. Length, 24 inches. White-spined, but closely set with them to the shoulder. Colour, deep green, and fruit uniform throughout. Capital bearer, quick grower, and well adapted for general culture.

Allen's Victory of Suffolk. Fruit, beautiful, when grown in a good heat, and cut in an early age. Uncommonly slender, exceedingly tender, and does not force well. It seldom grows longer than 20 or 24 inches. Spine black, and thickly set ; and is the handsomest fruit grown.

Sion House. Famous for winter culture, and in its. Colour, shining green ; almost devoid of

spines; never growing longer than 8 or 9 inches. Great bearer, hardy, and altogether one of the best of the winter cucumbers.

Cure's Stove Cucumber. Solely suited for winter culture, either in the stove or in frames. Length, 9 or 10 inches. Black spine, and a good-looking fruit. A capital bearer, and early habit.

Hort's Early Frame. Very early, growing to the length of 8 or 10 inches. Spine black, and colour deep green. Well adapted for winter forcing, and as early as any other. Fruit may be cut in eight weeks, in winter, from the sowing of the seed.

Stradsett Park. A fruit of surpassing excellence. Length, 26 or 27 inches. Slender. Somewhat resembling Allen's Victory, but surpasses it. Colour, pale green; spine, black, and thickly set. It was raised by Mr. D. Stewart, of Stradsett.

Stewart's Nonpareil. A fruit intermediate between Stradsett Park and Allen's Victory, One of the best in cultivation, but not so deep colour as some are. Spine, black. Slender. Length, 26 or 27 inches. It does not force well, and requires a strong constant heat to bring it to perfection. It was raised by Mr. Stewart, and obtained first prizes in 1839.

New Sion House. Similar to the preceding of the same name, and corresponds with it, except in length and hardy habit; forces well, and is a good bearer.

Length, two feet and upwards, beautiful, slender, and uniform.

Weedon's Cucumber was raised by the author of a very excellent little treatise on the cucumber. It is a handsome black spined, good fruit, forces well, and is a good bearer. Length, fifteen or sixteen inches. A variety of this, called *Weedon's Improved*, has gained the first prize at Ipswich.

Warham Champion has black spines, deep green colour, short shoulder, and attains in some cases a length of 20 or 24 inches. It is a good, beautiful, slender-growing kind, and succeeds well trained against a south wall, or on ridges.

Barne's Man of Kent is said to force pretty well, and to attain to a length of 20 or 24 inches. Colour, deep green ; spine, black.

Manchester Prize Fighter is of acknowledged excellence, raised in the neighbourhood of Manchester. It was second on the list for prizes at the Heaton Norris Cucumber Show, in 1840. It is a great bearer, has white spines, is slender in its proportions, and grows to the length of 24 inches. It is sometimes called *Walker's Prize Fighter*.

Walker's Pea Green was first on the list at the above show, in 1840. (*Duncan's Cucumber Culture*, 89.)

Young's Champion. Fruit two feet long, green,

white spined, excellent for winter forcing, being hardy and prolific.

Kenyon. A moderate sized kind, very generally preferred for early forcing near Liverpool.

Superb White Spine. Fruit about 22 inches long; shape handsome, hardy, and a good bearer.

Latter's Victory of England. Black spined, hardy, and long, but very deeply ribbed. A great favourite at Ipswich.

Brownston Hybrid. Long, handsome, black spined. Like the last, it has gained many prizes, but neither are very prolific, and require a high temperature.

Cuthill's Black Spine. Very prolific, length of fruit about 16 inches, good for early forcing.

The *Snake* is very slender, and attains the length, it is said, of 12 feet; and the *Fluted*, from China, has remarkably indented fruit, but these have no particular merits. *Ringleader*, *Tiley's Victory of Bath*, and *Pratt's Hybrid*, are good varieties, and have gained many prizes.

STANDARD OF MERIT.

DR. LINDLEY, after noticing that in all prize rules the superiority of the fruit is made to depend upon its length, combined with certain other qualities, justly observes, that though some of these qualities

are of importance, others are of little or no consequence ; and one, requiring the cucumber to be ribbed, is most absurd. Why a ribbed cucumber should be preferred to one with an even surface, seems difficult to divine. In peeling, the portion of it beneath the rind must necessarily be cut away ; and, consequently, great waste, as well as loss of the best part of the fruit, is occasioned. It is equally incomprehensible, why a black spined cucumber should be peremptorily declared to be superior to one with white spines.

Qualities such as these are perfectly arbitrary, add nothing to the appearance of a cucumber on the dinner-table, and have no relation to its good quality as a salad.

Then, cucumbers must be grown to an enormous length ; everybody wants to have his fruit longer than his neighbour's ; and if it is so long that no dish can be found to hold it, so much the better. But is there any common sense in this ? Of what use are these long fruits, except to make people stare ? Are they better flavoured ?—better bearers ?—better seeders ? Quite the contrary : they are simply longer, indeed too long to be placed on a dinner-table, too long to be eaten by a small party, too coarse to suit a cultivated palate, and are, in fact, fit for nothing, except to excite the admiration of the servants' hall.

If such things must be had to stare at, why not cultivate the Patagonian Cucumber, or the Snake Gourd, at once? The fact is, that a cucumber, 10 or 12 inches long, is much better in all respects, only it is not so extraordinary, and will not cause so much amazement.

Let a cucumber, adds Dr. Lindley, be a foot long, straight, of even thickness, with a flower still fresh upon its point; let it, moreover, be short necked, firm, brittle, and a free bearer, and you have nearly all that it is possible to desire. If, of the old prickly race, bloom—natural, not artificial—should be insisted on, because it ensures carefulness on the part of the grower, and the fruit looks better; but as cucumbers of the Smyrna and Turkish breed have no bloom, and they are among the best for the table, to require bloom as a *sine qua non*, is to exclude some of the most useful sorts in cultivation.

Finally, no cucumber show should be held later than June. In proportion, as the season advances, does the difficulty of growing this vegetable diminish; and it must be some very extraordinary circumstance indeed, that can render any cucumber worth a prize after June, in a society especially instituted for its cultivation. (*Gard. Chron.*, 1843. 19.)

It is observed above, that the bloom on the cucumber should be natural, not artificial, and very wisely, for as Mr. Fulton, gardener to Lord Northwick, ob-

served, the art of producing and keeping a fine natural bloom on cucumbers, either for a gentleman's table, for show, or for the market, merits great attention, both as to the perfect appearance of the fruit, and requires especial care to the general culture of the plant after the fruit is set. From that time a strong bottom heat should be given, and water plentifully, always at the back part of the frame; and at no time over their leaves, if the fruit is wanted for its delicate bloom and long regular shape. A fine foliage over all the bed is also a very essential point; and leaves should never be picked off near the fruit. Air, also, should be given very sparingly in the middle of the day, even in bright sunshine, and generally there should be a little admitted in the night, when the bottom heat is very strong, as by that means the air in the frames is kept sweet.

When the fruit has to travel, great care should be taken to pack it in narrow wooden boxes, in the largest stinging-nettle leaves that can be got, filling up the interstices with well-thrashed moss, and covering over with soft leaves of any kind. (*Gard. Mag.*, vi. 709.)

Relative to the rule in favour of black-spined cucumbers, it can only be because the best of the long varieties so characterized are more difficult to raise than the best of the white-spined, the latter usually not requiring so high a temperature.

Consonant with these considerations the following are given as absolute requisites in the standard of merit:—Length, not less than 12 inches ; diameter, one-ninth of the length ; colour, dark green ; spines, numerous, and equally distributed ; bloom, unre-moved ; circumference, circular and equal through-out ; neck and nose, each not more than a diameter long ; flesh, crisp and juicy ; flower, remaining on the fruit. In conformity with these, the annexed is a convenient tabular form in which the judges may award the prizes.

Prize . . .	1st	2nd
Exhibitor . . .	Richard Good	
Sort . . .	Sion House	
Mode of culture	Hot-water pit	
Length . . .	18 inches	
Diameter . . .	2 inches	
Form . . .	Circular&equal throughout	
Colour . . .	Deep green	
Neck . . .	2 inches	
Nose . . .	1½ inch	
Spine . . .	Numerous and regular	
Bloom . . .	Perfect	
Flesh . . .	Crisp and juicy	
Blossom . . .	Remaining	
General aspect	Very handsome and vigorous	
E. CUTHILL, T. WILD,		} Judges.

SOIL.

A FRESH loam, rather inclining to lightness than tenacity, as the top spit of a pasture, with the turf chopped fine and mixed, is, perhaps, as good a soil as can be employed for the cucumber. It will succeed in any rich open soil of the garden, for the hand-glass and natural ground crops. Some gardeners, however, for the forced plants, prefer a compost ; and the one most generally approved is one third top spit earth, from a rich upland pasture, one third vegetable mould, one sixth well decomposed loose dung, and one sixth drift or sea sand.

That the cucumber will thrive productively in a soil abounding in decomposing organic matters is evident from the following statement by Mr. Whitmore, gardener at Falkborne Hall, Essex :

“ The soil I use for all my cucumbers is nothing but decayed sawdust, and in which they seem to luxuriate. Observing a large heap of soil in the wood yard, which had for some years been carried from the saw pit, I had some of it carted to the melon ground ; I then formed my hills entirely of it, and when it was warm, turned into it my plants. In a few days the hills were one mass of roots ; I then, by degrees, earthed my bed with the same. The plants made shoots as thick as the finger, and by judicious stopping and thinning, bore abundantly. Many good

gardeners who saw them said, that if they had not had ocular demonstration of the fact they could not have believed it possible for cucumbers to flourish in rotten sawdust.

“My plants in the pinery are in seakale pots, in the same material; their fruit and foliage have been the admiration of everybody who has seen them; some of the leaves measured 22 inches across, and are of a dark green colour, approaching to black.” (*Gard. Chron.*, 1846. 405.)

Mr. Mills, gardener to Baroness de Rothschild, and one of our most successful cucumber cultivators, says, that for it, peat, alone, is the best soil. He prefers that which lies upon a subsoil of gravel, and not more than 4 inches thick, and only requires to be chopped up and used immediately, without addition or keeping. (*Mills, on the Cucumber*, 15.)

Mr. Duncan, another judicious cultivator of this plant, and gardener to T. Daniel, Esq., Henbury-near Bristol, gives the following good practical directions regarding the soil:—

“The soil should never be trod, or rendered compact; neither should heavy or clayey soil be used, though, of course, a heavier kind is necessary in the summer than in the winter. Vegetables, whose nature is to produce fruit in succession, like the cucumber, receive the greater amount of nourishment in the period immediately preceding the perfecting of their

fruit ; hence it is a practice with me to supply a new store of soil, at intervals, during their growth, and always previously to a time of more than ordinary interest, such as horticultural exhibitions. This soil is supplied as a casing over the whole surface when the plants are trained upon trellises, as most of ours are, but when extending over the soil the branches are laid successively, in a proportion of new mould, which is the same thing ; hence, I always provide a shallow depth at first, that I may have an opportunity of affording a new supply when it is most needed.

“To render the pasture soil fit for use, it should be frequently turned and exposed to the action of the weather ; and in the winter, previous to using, a fourth of cow dung, or vegetable mould, added to it ; or, in the absence of these, leaf mould and frame dung. Pigeon’s and sheep’s dung are more stringent, in consequence of the saline matter they contain, and are very appropriate for adding, as a casing, both for plants in the soil and in the pots, or when it is intended or desired to have fruit of extraordinary fineness, and plants of vigorous growth.

“Neither the soil of the bed, nor on the linings, should be deeper than 10 or 12 inches, including those additions of soil made in the latter periods of culture. A less depth will not be sufficient, particularly if the plants are of a vigorous growth.

“The inclination of the soil in the bed, throughout the process, should be such as to facilitate the absorption of the solar rays. Cucumber soil should never be sifted ; all that is necessary may be effected by turning and exposure, and a little careful disintegration. This will preserve the best parts, and prevent any from being rejected. I never allow the soil I intend using in the following year to be exposed to excess of rain ; and it is a good plan in respect to this, in frosty weather, to remove the frozen part every day into an open shed. It will become by this means, when it is required for use, in fine condition, and the eggs of insects, &c., and the common earth worm, will be destroyed.” (*Duncan's Cucumber Culture*, 33.)

MANURES.

If the crop be grown in the soil of the bed, and not in pots, that soil being of the fertile composition I have directed, no other fertilizer will be required by the plants. If grown in pots, or other confined portions of earth, then *liquid manure* may be given to them with advantage. This may be made according to Mr. Ayre's formula, given under the head “STOVE CULTURE,” or it may be prepared from guano, half an ounce being mixed thoroughly with each gallon of water.

A solution of *nitrate of soda*, one ounce to a gallon of water, and applied once a fortnight, is said to increase the vigour of the plants. The same is said of *common salt*, and that it does not even injure their leaves if poured over them. A very weak solution of *muriate of ammonia*, not more than half an ounce to two gallons of water, has been applied beneficially, to invigorate weak plants. I state these facts without recommending the adoption of the practice, because I know that the chief of our most successful cucumber growers do not employ any saline manures.

MODES OF PROPAGATION.

By Seeds.—Plants raised from seeds are the most vigorous, and produce the largest fruit, therefore they should always be raised in this mode when this is to be exhibited. Indeed, it is the best to employ during the months from November to March, both inclusive. Mr. Duncan says, the best time for raising plants, by either seed or cuttings, for winter culture, is in the first and last weeks of September.

If the production of fine fruit is the object, and the sowing is any time from autumn to early spring, do not remove the seed from the parent cucumber until it is actually required for insertion in the soil; but if an abundant crop, rather than fine specimens, then seed which is one, two, or more years old, may be

advantageously employed. To test the quality of the seeds they should be put into a vessel of water, and only those be sown which sink. The seeds which float are unfertile.

Cucumber seeds will retain their germinating power for eight or ten years.

Propagation by Cuttings.—Cuttings five or six inches in length, taken from the tops of bearing branches of vigorous plants, from about the end of March to the close of October, planted in pots of rich mould and plunged in a hotbed, or bark bed in a stove, where the temperature is not less than 70 degrees, will take root, if regularly watered, in less than a fortnight, and may then be planted in a hotbed for fruiting, which they will do as soon as the roots can support them, perfecting the fruit before Christmas. They may thus be had in succession, and being propagated from year to year, are rendered, as if it were, perennial. The plants are less succulent, and, consequently, less liable to damp off, or suffer from the low temperature to which they are liable to be exposed in severe seasons. Mr. Mearns puts four inches and a half of mould in pots nine inches deep, in which the cuttings are planted and watered, the tops of the pots being covered with flat pieces of glass, which answer the purpose of a hand light, whilst the sides of the pot afford a sufficient shade until the roots are formed.

When the plants have afforded their first crop, any small fruit must not be waited for, but the plants be cut back to the lowest shoot, the soil gently stirred and a little fresh spread over the surface ; the same attention must be paid them as before, when they will shoot afresh and produce a good crop. (*Johnson's Mod. Gard. Dict.*, 180.)

Propagation by cuttings is truly said not to be a system deserving adoption, except, when of any variety there is a short supply of seed, and it is desired to increase the stock of a new variety. Great attention is required for the first two months in stopping and thinning the fruit, cuttings being much more prolific than plants raised from seed, showing much more fruit than the plants are able to bring to maturity, so that without stopping and thinning they will very soon be exhausted. (*Gard. and Flor.*, iii. 102.)

Layers.—If a branch of a cucumber vine be pegged down beneath the soil, so that a joint be buried an inch or more beneath its surface, roots will be thence emitted, and the extremity of the branch will become a separate plant. This is not so easy a mode of increasing the numbers of a particular plant as by cuttings, added to which, if many of the branches are layered, though these become plants, the parent stem frequently is rendered weak, and even dies altogether.

Another mode of layering is as follows :—“ Sus-

pend, in convenient places, pots having large holes beneath; through these holes the points of growing shoots are introduced, and the pots having a little moss in the bottom, are then lightly filled with vegetable mould: they may also be propagated by enveloping a joint of a growing shoot lightly with moss; the moss should be kept continually moist, and roots will soon be emitted into it, and when enough are produced, the plant may be detached.” (*Moore’s Cultivation of the Cucumber*, 26.)

OPEN-GROUND CULTURE.

The sowing for these crops must be performed at the close of May, or early in June. A rich south-west border, beneath a reed or other fence, is peculiarly favourable, as the plants then enjoy a genial warmth without suffering from the meridian sun. The border being dug regularly over, and saucer-like hollows, about fifteen inches in diameter and one or two deep, formed five feet apart, the seed may be sown six or eight in each.

Seed may also be sown beneath a hedge of similar aspect, and the plants either trained to it or to bushy branches slightly sloping from the perpendicular. If the weather be dry, it is requisite to water the patches moderately, two or three days after sowing. In four or five, if the season is genial, the plants will make their appearance, and until they have attained their

rough leaves, should be guarded from small birds, which will often destroy the whole crop by devouring the seminal leaves.

If the season be cold and unfavourable, plants may be raised in pots under a frame or hand-glasses, as directed for those crops; to be thence transplanted, when of about a month's growth, or when the third rough leaf appears, into the open ground, shelter being afforded them during the night. Water must be given every two or three days, in proportion to the dryness of the season, applying it of an afternoon, or early in the morning.

Allow no more than two, or at most three, plants to grow together in a patch, about nine inches apart from each other. Attend to the training as for the frame crops; but stopping is seldom needed, the plants rarely being over-luxuriant. They will have fruit ready for use in August and September. (*Johnson's Dict. Mod. Gard.* 181.) See GENERAL CULTURE.

Mr. Ayres says that a considerable portion of heat may be worked by artificial means into the soil for the open-ground crop. Thus, when the bed has been the marked out, let the soil be dug over in the evening of every sunny day, and then either raked perfectly smooth or covered with mats or litter; in this way the radiation of accumulated heat being nightly intercepted, a sufficient quantity of heat will in a week or

ten days be collected to raise the temperature 8 or 10 degrees above that of the adjoining soil. Those who have no garden ground, but have yards or balconies on a south, east, or west exposure, may plant them in very rich compost, in large pots, or boxes eighteen inches or two feet square, and train the plants to the wall. They will require precisely the same treatment in watering, stopping, &c. as directed for pots in the cucumber-house. (*Ayres's Treatise on the Cucumber*, p. 41.)

CULTURE UNDER HAND GLASSES.

THE first sowings for these crops must be in the last two weeks of March ; to be repeated in the middle of April and May. The seed may be inserted in a moderate hotbed under hand-glasses, or in the upper side of one of the frames already in production, either in pots as directed for the frame crops, or in the earth of the bed, to be pricked into a similar situation when of four or five days' growth, inserting only two plants, however, in each pot. They must remain in the hotbed until of about a month's growth, or until they have attained four rough leaves ; being then stopped they are fit for ridging out finally.

The ridges may be founded on the surface, or in trenches a foot and a half deep, in either case forming them of well prepared hot dung, three or four feet wide and two and a half high ; the length being

governed by the number of hand-glasses, between each of which three feet and a half must be allowed.

The earth is to be laid on eight inches thick ; when this becomes warm the plants may be inserted two, or at most three, under each glass.

It is an excellent plan to slope the surface of the soil and cover it with straw on reeds laid straight and thatchlike to shoot off excessive rains, to keep the fruit clean, and to preserve moisture to the roots in dry weather. The same treatment applies to the open ground crop.

Watering, airing, covering. &c., must be conducted with the precautions directed to be practised for the frame crops. The glasses should be kept on as long as possible without detriment to the plants; to prolong the time, the runners must be made to grow perpendicularly ; and still further to protract their continuance, if the season is inclement, the glasses may be raised on bricks. When no longer capable of confinement, the runners must be pegged down regularly, advantage being taken of a cool cloudy day to perform it in ; but the glasses, even now, may be continued over the centre of the plants until the close of May or early in June, with considerable advantage. Weeds must be carefully removed. Waterings should be performed as often as appears necessary.

If there be a scarcity of dung, in the last week of April, or during May, circular holes may be dug, two

feet in diameter, one deep, and four apart. These being filled with hot dung, trod in moderately firm, and earthed over about eight inches, are ready for either seeds or plants. With the shelter of the hand-glasses they will be scarcely later in production than the regular ridges. (*Johnson's Dict. Mod. Gard.* 180.)

HOTBED CULTURE.

Forcing Ground. The aspect and declination of this is of very great importance ; not so much on account of the atmospheric warmth which may be thus secured, though this is available and beneficial, as on account of the utmost amount of light being desirable. Food and heat are of benefit to the plants only in proportion to the light enabling the leaves to elaborate the sap which those other contingencies enable the roots to imbibe.

Upon this point we have these practical remarks from Mr. Duncan :

“ Those gardens lying open to the sun, especially in the morning, having an angle of 8 or 10 degrees S. or S.W. or S.E., are much earlier than those not so steep, or not so well exposed. No winter forcing will succeed well that is not under the congenial influence of the solar rays. A slight declination, especially on a porous subsoil, will permit the absorption of all those rays that pass over on a contrary inclina-

tion; but in summer it is of less consequence, because the rays are more perpendicular, and strike everywhere, should there be no obstacle to prevent them. If local considerations permit, the figure of the ground should be a parallelogram, having a roadway dividing it longitudinally into two unequal parts, the larger being the north side. The pits should be placed on the division south of the road, allowing a border from the boundary wall of 10 or 12 feet. There should be room enough between the pits and border for linings and a walk, without interfering with the pits on one side, or the border on the other. The dung beds should be placed in a line parallel with the pits, on the other side of the road, and far enough from it for the linings of the beds; other arrangements are necessary for soil, dung, leaves, &c. and at one side there should be a shed or sheds for keeping the frames and lights in, and for potting, and to keep pots, soil, &c. The whole space within the line of business should be paved, sloping towards the south, to keep the ground clean and dry, and to collect the water escaping from the beds. (*Duncan's Culture of Cucumber*, 120.)

The forcing ground must be so situated as to be entirely free from the overshadowing of trees, buildings, &c. A reed fence surrounding it on all sides is a shelter that prevents any reverberation of the wind, an evil which is caused by paling or other solid inclo-

sure. This must be ten feet high to the northward or back part, of a similar height at the side, but in front only six. The wicket or gate must be of sufficient width to admit a loaded wheelbarrow. An inclosure of this description, 100 feet in length and 60 broad, will be of a size sufficiently large for the pursuit of every description of hotbed forcing. But for cucumbers, melons, and a few inferior articles, a space for six or eight lights is sufficient. Fruit may be forced slightly by being trained within it on the southern aspect; the fence on that side in that case must be of brick or wood. To prevent unnecessary labour this inclosure should be formed as near to the stable as possible.

For the reception of the bed, a trench is often dug of its determined length and breadth, and six inches deep, if the soil is wet, or 18 inches or more if it is dry. In a dry soil or climate this cannot be productive of much injury, but otherwise it almost always chills the bed; at the same time it is to be observed that it is never productive of benefit, further than, not being so high, it is easier of access, but gives much additional trouble, both at the time of founding and afterwards, when linings are to be applied.

Time and Mode of Sowing. Sow for the earliest crops in the last week of September, also in October, November, and December, and two or three times a month during January and following months, until

the middle of May. All these sowings should be plentiful, especially the earliest ones, as failures are in these sowings most likely to occur. If fruit be required for Christmas, the sowing should be the first week in August; for it is quite certain that it is easier to provide fruit then, or at any other given time, by getting the plants into bearing about a month previously, than by attempting to have the first fruit at the time desired.

Seedling Bed. This need be no larger than is sufficient to be covered by a one or two-light frame. Mr. Mills says that it should be three feet high at the back and two feet six inches in front; and when the lights are put on, eight or ten days should be allowed for the bed to sweeten before the seeds are sown; during which time the surface of the bed should be forked over every other day, about a foot deep; and, should it appear dry, as much water should be given as will make it moderately wet. Air must be admitted by raising the lights at the back with a wooden wedge, according to the quantity found necessary to be given to allow the steam to pass off freely. In order to prove whether or not the bed be sweet, shut the lights down close for three or four hours; then take a lighted candle in a lantern, push down one of the lights, and put the candle and lantern into the frame; and if the candle continues to burn, the bed will be in a fit state to

receive the plants or seeds. (*Mills' Treatise on Cucumber*, 13.)

The soil of the Seedling Bed need not be more than five or six inches deep. The seeds are best sown four together in small pots, and plunged in the earth of the bed; the seed not buried more than half an inch deep. When the seminal leaves are half an inch in breadth, those in the earth of the bed must be pricked three together in small pots, quite down to their leaves in the earth, which should be brought to the temperature of the bed before this removal, by being set in it for a day or two previously; those seedlings that have been raised in pots must likewise be thinned to three in each. They must remain plunged in the hotbed until their rough leaves have acquired a breadth of two or three inches, when they are fit for ridging out finally.

During this first stage of growth, great care must be taken that air is admitted every day as freely as contingent circumstances will admit, as also at night, if the degree of heat and steam threatens to be too powerful. It must never be neglected to cover the glasses at night, apportioning the covering to the temperature of the air and bed. The heat should not exceed 80 deg. in the hottest day, or sink below 65 deg. during the coldest night. If the heat declines, coatings of hot dung are to be applied in succession to the back, front, and sides, if that source of heat

be employed. As the soil appears dry, moderate waterings must be given, care being taken not to wet the leaves. The best time for applying it is between ten and two of a mild day, the glasses being closed for an hour or two after. The temperature of the water must be between 65 deg. and 80 deg. The interior of the glass should be frequently wiped to prevent the condensed steam dropping upon the plants, which is very injurious to them. If the bed attains a sudden violent heat, the necessary precautions to prevent the roots of the plants being injured or scalded must be adopted; but if hot water is the source of heat, this danger is avoided altogether. (*Johnson's Dict. Mod. Gard.* 176.)

Raising cucumber plants in the early part of the season causes much anxiety to gardeners having limited conveniences at their command, and especially where they have nothing to depend upon but fermenting material, for not only have they five or six week's trouble in preparing dung to form a seed-bed, but after that is formed, they have three weeks or a month to wait before the plants are fit to ridge out on the fruiting-beds.

This, to a small grower, is not only a great trouble, but a serious expense; therefore, a system of packing that will ensure the safe transmission of cucumber plants to a distance of a hundred miles or more, at the time the thermometer registers several degrees of

frost, will not be without use to some. The materials necessary to secure this are two boxes, one of a size suitable to hold the plants, and the other about four inches larger every way ; a quantity of dry moss, some carded wool, and a thick woollen cloth, similar to those used for horses. In packing the plants, which should be hardened for three or four days previously, by being placed in a moderately dry heat of from 55 to 60 degrees, a little moss must be put on the surface of each pot, and secured down with matting.

A small stake should be placed in the centre of each pot, and the plants should be secured to it, so as to make their foliage occupy as little space as possible. Four or five more sticks are then to be tied firmly round the outside of the pot ; and the whole may be enveloped in a sheet of paper. This being done, place the plants in the small box ; pass some narrow strips of wood, which may be secured by nails from the outside, over the rims of the pots, to prevent the plants from being injured, if the box should upset ; and fill the latter up firmly with carded wool, which has been previously warmed. After the lid is fastened down, the box must be placed within, and equidistant from the sides of the larger one, over the bottom of which a layer of dry moss should be previously placed ; the space between the boxes to be tightly filled with the same material.

The lid of the large box may then be nailed down, and the whole wrapped up and corded in the woollen cloth.

Packed in this way, plants have been sent in mid-winter a journey in which they have been forty-eight hours on the road without their sustaining the least injury. Under ordinary circumstances, and for a journey of a few hours, the plants would, perhaps, pass uninjured in the small box, packed in wool, and wrapped in the woollen cloth; more especially if we could ensure its travelling "inside" the coach; but as coachmen are not to be trusted, it will not be advisable to run the risk with valuable plants. Wool, hair, or charcoal dust, would be superior to moss, to fill in between the boxes, but they would be more expensive. (*Gard. Chron.*, 1842. 805.)

Dung beds, for fruiting, are made in two forms, viz., so that the heat may be communicated direct to the earth in which the plants are growing, by this being placed upon the fermenting mass, or by there being a chamber beneath the earth to which the heat and steam are admitted from linings or coatings of dung with which it is surrounded. Both these systems labour under the disadvantage of having the heat, contrary to the course of nature, emanate from below, and thus placing the roots in a temperature as hot, or hotter, than that in which the leaves are vegetating.

The hotbed, for fruiting, must be of the largest size, being required to generate during the coldest season, a high degree of heat, and for a longer time than that devoted to raising seedlings.

A hotbed is usually made of stable-dung, of which that made by the best-fed horses is to be preferred.

It should be about ten days from the stalls, and without too large a proportion of litter. After being thrown into a heap, of conic form, for five or six days, it must be so turned over that the inner parts are brought to the outside, the clots well separated with the fork, the heap being reformed conical as before, and left for an equal number of days. By this time and treatment the dung in general acquires a sufficient and steady heat; if, however, it is very dry and fresh, it must be moderately moistened, and left for five or six days more. At the time of forming the heap, as well as at every turning, water should be applied if its substance appears at all dry, as a regular state of moisture is of first importance to the obtaining a favourable fermentation. It should remain until the straw in general assumes a dark brown colour, when it should be immediately formed into the bed. Leaves, or tan, may be mixed with advantage, as heat is thereby generated during a greater length of time. In cold, wet, or boisterous weather, the heaps should be covered to a moderate depth with litter.

The site of the bed being determined, a stake

should be turned perpendicularly at each of the four corners, as a guide for the perpendicular construction. The dung must be thoroughly mixed just before it is used, and be carefully separated and spread regularly with the fork, as the bed is formed with it. It is beneficially settled down in every part alike by beating with the fork as the work proceeds, rather than by treading; for if too much compressed, a high degree of heat is generated, but is soon spent; a contrary phenomenon is often caused if trod to a still greater excess, namely, that no heat at all is engendered.

The longest or littery part of the dung should be laid at the bottom of the bed, and the finer fragments of the dung upon the top. If it is not regularly and moderately moist throughout, it should be sprinkled over with water. As the surface on which the bed is founded is usually horizontal, so is the dung laid perfectly parallel with it. Mr. Knight recommends it, on the contrary, to be equally inclined with its foundation, that it may associate well with the new form, which he recommends for frames.

The breadth of a bed must always be five feet, and in the depth of winter four and a half feet high when firmly settled; to form it of this size, about twelve barrow-loads of dung are required to a light.

In early spring, a height of three and a half feet is sufficient, and as the season advances, it may be

reduced to three, or two and a half feet. In May, or early summer, when the only object is to hasten the germination of seeds, two feet or eighteen inches is not less than the necessary height. The length of the bed, in all cases, must be guided by the size of the frame.

To prevent the sudden changes of temperature in the external air affecting the heat of the bed, coat the sides of the bed with sand; coal-ashes, or earth, might be substituted, to a thickness of two feet.

As the heat declines, linings, or as they might be more properly called, coatings, are made use of, which consist of hot fermenting dung, laid from eighteen to twenty-four inches, in proportion to the coldness of the season, &c., all round the bed to the whole of its height, and if founded in a trench, one equally deep must be dug for the coating, it being of importance to renew the heat as much as possible throughout its whole mass; if, after a while, the temperature again declines, the old coating must be taken away, and a similar one of hot dung applied in its place. As the spring advances, the warmth of the sun will compensate for the decline of that of the bed; but as the nights are generally yet cold, either a moderate coating, about nine or ten inches thick, is required, or the mowings of grass, or even litter may be laid round the sides with advantage.

The depth of earth, as well as the time and manner

of applying, vary considerably ; it should never be put on until four or five days after the bed is formed : before it is applied, the edges of the bed should be raised full eight inches higher than the middle, as from the additional weight of the frame they are sure to sink more and quicker, thereby often causing the earth to crack and injure the roots of the plants.

The roots of plants being liable to injury from an excessive heat in the bed, several plans have been devised to prevent this effect. If the plants in pots are plunged in the earth of the bed, they may be raised an inch or two from the bottom of the holes they are inserted in by means of a stone. But a still more effectual mode is to place them within other pots, rather larger than themselves ; a space filled with air being thus interposed between the roots and the source of heat, an effectual security is obtained. To prevent the same injury occurring when the plants are in the earth of the bed, a moderate layer of neats-dung laid between the earth and the fermenting mass is an efficient precaution, and is much preferable to a similarly-placed layer of turf, which interrupts too much the full benefit of the heat. A plan recommended by Bradley is well worthy of notice. A woven hurdle, somewhat larger than the frame, being placed upon the dung, on this its woodwork can rest, and the earth is laid within it, thus the whole can be moved together without disturbance. This would

especially be of advantage when bark is employed, which requires occasional stirring to renew its heat in case of emergency, when time cannot be allowed for the bed becoming regular in its heat before the plants are inserted. Besides these precautions, vacancies should be left in the mould, and holes bored with a thick pole into the bed, which must be filled up with hay or dung when the danger is passed.

For ascertaining the internal temperature of the bed, the thermometer is the only certain guide, as it also is for judging of the temperature of the air within the frame; the mode of introducing it into the body of the bed, is to have the thermometer inclosed in a wooden case of the size and form of an ordinary dibble, which is to be lined with baize and fitted with a cap of tinned iron to exclude the exterior temperature. The end which enters the earth is shod with perforated copper. In conjunction with the thermometer, trying sticks may be employed for occasional observation; these are smooth laths of wood, about two feet in length, thrust into different parts of the bed, which being drawn out and grasped quickly afford a rough estimate of the heat of the bed.

The small extent of the frame, and the rapid deterioration of the air within it by the plants, render its frequent renewal necessary. To effect this, the common practice is to raise the glasses in proportionate

heights according to the state of the air ; and to prevent any injury arising when necessarily admitted during inclement weather, mats are hung over the opening ; but notwithstanding these precautions, the supply of air can seldom be regular ; hence, and from sudden chills, the plants are often checked, and sometimes essentially injured. It may be remarked here, that raw foggy days, if any thing, are more unfavourable than those that are frosty for the admission of air. A complete remedy for all these difficulties is afforded by a plan, which succeeds on the principle that warm air ascends, and simply consists of a pipe passed through the body of the bed, and one end communicating with the exterior air, the other opening into the frame, at one of the top corners, of which an aperture must be made ; the heated air of the frame will constantly be issuing from this aperture, and its place supplied by that which rises through the pipe. A pipe of lead may be used, about two or three inches in diameter, bent nearly at a right angle, and each limb being three feet long, one of these to be placed horizontally as the bed is forming, with its mouth extending in the open air, that of the other opening into the frame ; a cap should be fitted to the first, and by a slit on its under side, the quantity of air admitted can be regulated.

Although stable manure is generally employed for the constructing of hotbeds, yet there are several

other vegetable matters that are also in use for the same purpose. Tanner's bark, from its long continuance and regularity of heat, is much to be preferred. In many situations it can be obtained at a cheaper rate than stable dung; it should be employed when fresh drawn from the vats, or at most when a fortnight or three weeks old; it must lay in a heap for six or eight days to allow the escape of the superfluous moisture: in summer this is not of such material consequence, as an excess of wet is, at this season, not so liable to prevent fermentation.

If the ground is dry, a pit three feet deep may be dug, and is better lined with slates, boards, or brickwork, but whatever may be the nature of the soil, it is best to form this case or bin of a similar height upon the surface. Without some support the tan will not form a solid bed, and if mould becomes mixed with it, the fermentation is retarded or entirely prevented. The breadth must not be less than five or six feet, or of a length shorter than ten or twelve, otherwise the heat will not be lasting. When the bark is laid, it must be gently settled with the fork, but never trodden upon; for if violently compressed, it loses the power of fermenting: if the bark is fresh and not ground very small, it attains a sufficient warmth in a fortnight for the insertion of the plants, and will continue in heat for two or three months; the larger the fragments of the bark are, the longer

time it requires to ferment, but in an equal proportion it attains a higher temperature and preserves it much longer ; a middle sized bark is, therefore, in general to be preferred ; and added to the above consideration, it is to be remarked that, when made of large fragments, violent and sudden excesses often arise, even after the bed has been constructed two or three months : on the contrary, if very small the fermentation soon passes off.

When the crops are removed, and the heat declines, if well stirred, and a load or two of fresh bark mixed with it, the bed will acquire and continue in heat for an equal further lapse of time : this may be repeated throughout the year as often as the heat is found to decline. But it is necessary every autumn, entirely or nearly so, to reconstruct the bed with fresh bark ; for when the old is far advanced towards putrefaction, it will no longer generate heat.

The leaves of the oak and sweet chesnut, and doubtless of many other trees, answer for hotbeds as well, or even better than tanner's bark, since they will continue to afford a moderate heat for nearly twelve months without any addition or stirring. They are to be collected as they fall in autumn, and carried to some situation, or be so hurdled in, that they may be preserved from scattering by the winds ; the heap should be six or seven feet thick, trod firmly down, and moderately watered

if dry. In a few days, a very powerful heat is produced, and in five or six weeks will have become so regular, that it may be broken up and the beds constructed with its materials, water being again employed if dryness appears, and they must be well trod down as before. There are many other substances that generate heat during fermentation ; there is perhaps no vegetable substance that does not ; even a heap of dry sticks acquires a strong accession of temperature if moistened. Mr. Burnet recommends the trial of the refuse matter thrown off in dressing flax, for constructing hotbeds : this refuse he says he has observed, when left undisturbed, continue at a temperature of 64 deg. for many months : he seems to intimate as long as fourteen. This material is, however, to be had in very few districts. Grass and other green herbage, and even wetted straw mixed with coal-ashes, have been used on an emergency with success. Instead of forming hotbeds with open sides, as has been hitherto described, *pits* of brickwork and other materials are very generally constructed for containing the fermenting mass. (*Johnson's Dict. Mod. Gard.* 324)

Heating by Linings. The following plan, suggested by Mr. W. Jones, has the great merits of simplicity and cheapness :

“ In the first place measure the frame, and then dig a hole three feet deep, and sufficiently long and

wide to admit of the frame standing two feet six inches clear of the sides all round, which space will be used for dung linings; then take some bundles of old pea-sticks, or any other coarse wood, cut the exact length or breadth of the box, and build up a stack of them in the middle of the hole to the height of four feet; lay some long litter on the top of this to prevent the soil mixing amongst the wood, and then place on the box; after which, lay about six inches of soil all over the surface inside, and press it well against the sides of the box, to prevent the steam from getting in and injuring the plants. Form a hill under the centre of each light to receive the plants, which may be put in as soon as the temperature has been raised to a sufficient degree, *i. e.* 75 or 80 degrees, by means of dung linings all round the sides. By this simple plan the gardener will have complete control over the bottom heat, which is a very essential point in keeping his plant in health and vigour: by turning the linings occasionally, he can regulate it from one end of the year to another with great facility. As the wood forms an air chamber underneath the soil, it will take less dung to keep up a proper temperature for two or three lights of cucumbers grown in this manner than any other. But previous to working dung into these linings, it should be allowed to ferment, and thus the rankest of the steam will pass off." (*United Gard. Journ.* 1846. 41.)

The chief advantage heating by linings has over the mode of having the dung directly beneath the soil of the bed, is the facility it affords to renewing the heat by fresh linings whenever requisite. On the other hand, linings are least economical of heat, this radiating perpendicularly more profusely than in any other direction. To check this, to confine its course more under the earth of the bed, and to keep the linings from being chilled by excessive rain, shutters to cover them during early forcing are necessary, particularly for the front linings, to throw off the water that falls on the lights. And they may be so constructed as to convey the water, falling on the lights, to the east and west corners of the pit, into a small drain, and thence to be conveyed away.

The frames. A one-light frame may be about four feet and a half in width from back to front, and three feet six inches the other way; fifteen or eighteen inches high in the back, and nine in front, with a glass sash or light, made to fit the top completely, to slide up and down, and move away occasionally.

The two-light frame may be seven feet long, four and a half wide, and fifteen or eighteen inches high in the back, with bars reaching from it at top to the front, serving both to strengthen the frame and help to support the lights; the two lights to be each three feet six inches wide, and made to fit the top of the frame exactly.

The three-light frames should be ten feet six inches long, four and a half wide, and from eighteen inches to two feet high in the back, and from nine to twelve or fifteen inches in front—observing that those designed principally for the culture of melons, may be rather deeper than for cucumbers, because they generally require a greater depth of earth on the beds; though frames, eighteen or twenty inches in the back, and from nine to twelve in front, are often made to serve occasionally, both for cucumbers and melons; each frame to have two cross-bars, ranging from the top of the back to that of the front, at three feet six inches distance, to strengthen the frame, and support the lights; and the three lights to be each three feet six inches wide; the whole together being made to fit the top of the frame exactly, every way in length and width.

Sometimes the above sort of frames are made of larger dimensions than before specified; but in respect to this it should be observed that if larger they are very inconvenient to move to different parts where occasionally wanted, and require more heat to warm the internal air: and in respect to depth particularly, that if they are but just deep enough to contain a due depth of mould, and for the plants to have moderate room to grow, they will be better than if deeper, as the plants will be then always near the glasses—which is an essential consideration in early

forcing—and the internal air will be more effectually supported in a due temperature. For the deeper the frame, the heat of the internal air will be less in proportion, and the plants being far from the glasses will be disadvantageous in their early growth. Besides, a frame too deep, both in early and late forcing, is apt to draw the plants up weak; for they always naturally aspire towards the light, and the more space there is the more they will run up; for which reason the London kitchen gardeners have many of their frames not more than fourteen or fifteen inches high behind, and seven in front, especially those which are intended to winter the more tender plants, such as cauliflower and lettuce, and for raising early small salad herbs, radishes, &c.

The woodwork of the back, ends, and front, should be of inch or inch and a quarter deal, as before observed, which should be all neatly planed smooth on both sides; and the joints, in framing them together, should be so close that no wet nor air can enter. The cross-bars or bearers at top, for the support of the glasses, should be about three inches broad and one thick, and neatly dovetailed in at back and front even with both edges, that the lights may shut down close, each having a groove or channel along the middle to conduct off all wet falling between the lights. At the end of each frame, at top, should be a thin slip of board, four inches broad, up to the

outside of the lights, to guard against cutting winds rushing in at that part immediately upon the plants, when the lights are occasionally tilted behind for the necessary admission of fresh air, &c.

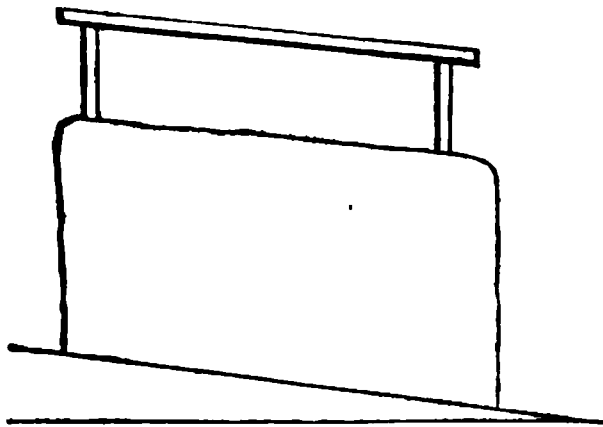
With respect to the lights, the woodwork of the frame should be an inch and a half thick, and two and a half broad; and the bars for the immediate support of the glasswork should be about an inch broad, and not more than an inch and a half thick; for if too broad and thick, they would intercept the rays of the sun, so should be only just sufficient to support the lights, and be ranged from the back part to the front, eight or nine inches asunder.

All the woodwork, both of the frames and lights, should be painted to preserve them from decay. A lead colour will be the most eligible; and if done three times over, outside and in, will preserve the wood from the injuries of weather, and from the moisture of the earth and dung.

Mr. Knight has suggested an important improvement in the form of frames. He observes, that the general practice is to make the surface of the bed perfectly horizontal, and to give an inclination to the glass. That side of the frame which is to stand towards the north is made nearly as deep again as its opposite; so that if the mould is placed an equal depth (as it ought to be) over the whole bed, the plants are too far from the glass at one end of the

frame and too near at the other. To remove this inconvenience, he points out the mode of forming the bed on an inclined plane ; and the frame formed with sides of equal depth, and so put together as to continue perpendicular when on the bed, as represented in the accompanying sketch.

For the winter forcing of cucumbers the angle of inclination of the ground should be much greater for the sake of obtaining more rays of solar light and heat during that season.



There are several minor points in the construction of frames that deserve attention. The strips of lead or wood that sustain the panes of glass should run across the frame, and not lengthways ; they then neither obstruct the light nor the passing off of rain. The inside of the frame should be painted white, since plants generally suffer in them for want of light ; if the accumulation of heat was the object in view, the inside colour should be black. (*Johnson's Dict. of Mod. Gard.* 251.)

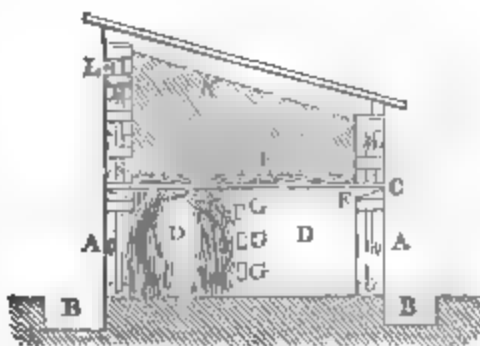
Pits, though most expensive when first constructed

fully repay for the outlay by the saving of labour, economy of heat, and greater certainty in the crops during after years, to say nothing of their superior neatness. The following are the best, and are the structures suggested and employed by some of the most successful of modern cucumber cultivators.

Mr. Flanagan only allows the heat of fermenting dung to be employed, the steam being prevented entering the frame. One advantage arising from this he states to be, that fresh made dung may be employed, and consequently the loss sustained by any preparation is prevented. If, however, it be a fact that the steam of dung is rather beneficial than otherwise, fresh fermenting dung can be used without any detriment that I am aware of in other pits of which we have plans. Mr. F. describes his pit as follows:—It is four feet deep within, the lowest ten inches of solid brickwork sunk in the earth; the remainder is a flue three inches wide in the clear, carried entirely round the pit, the inner wall of which, forming the sides of the pit, is four inch work, well bedded in mortar, and pointed to prevent the steam penetrating; the outer wall of the flue is also four inch, but open work to admit the steam, and that of dung coatings into the flue, the top of which is rendered tight by a covering of tiles, &c. The frame rests on the external wall of the flue. The cavity of the pit, which is kept dry by means of drains, is nine feet two inches long, two feet eight inches

wide, and four feet deep. It is filled with broken bricks to within eighteen inches of the top, then a foot of short cold dung, six inches of very rotten dung trod down so as to admit half an inch depth of coal-ashes, for preventing the intrusion of any worms that may be in the dung, completes the structure.

The accompanying sketch and references will fully explain the plan of Mr. West. D D, chamber in which the dung is placed, three and a half feet deep, surrounded by 9-inch brickwork. One half of this is filled longitudinally with dung at the commence-



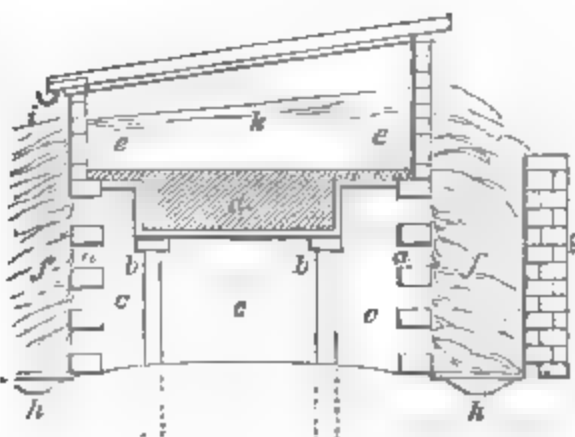
ment, which, if kept close shut up, will last twelve or eighteen days, according to the quality of the dung. As the heat declines, the other side is filled, and the temperature is further sustained by additions to the top of both as the mass settles. When this united heat becomes insufficient, the side first filled being cleared, the old manure must be mixed with some fresh, and replaced, this being repeated alternately to either heap as often as necessary. A A, are the doors, two of which are on each side for the admission of the dung. They are two and a half feet square, fitted into grooves at the bottom, and fastened by means of a pin and staple at the top. B B, are small areas

sunk in front, surrounded by a curb of wood ; G G G, are bars passing longitudinally as a guide and support in packing the dung ; C, represents a bar of cast-iron, two inches wide and three-quarters of an inch thick, placed on the edge of which there is a row, a foot asunder, across the chamber, to support a layer of wood branches and leaves, H, for the purpose of sustaining the soil, K, in the upper chamber ; E E, represents the orifices, of which there are a series all round the pit, communicating with the flue F F F, which surrounds the beds ; the exterior wall of this flue is built with bricks laid flat, the inner one of bricks set on edge. The flue is two inches wide, and for the sake of strength bricks are passed occasionally from side to side as ties. The top of the flue, and the internal part of the wall, which rises at the back and front to the level the earth is meant to stand, are covered with tiles, over the joints of which slips of slate bedded in mortar are laid to prevent the escape of the steam of the dung. L, represents one of two plugs, with stop holes left to regulate the heat and steam as may be necessary. The outer wall supports the lights. For the convenience of fixing the dung, it is best to fill the half of the chamber at the commencement, before the branches, mould, &c., are put in. (*Johnson's Dict. Mod. Gard.*)

Mr. John Mearns, gardener to William Harbing, Esq., at Shopden Court, near Leominster, grows early

cucumbers in a pit the walls of which (a) are of open wicker - work

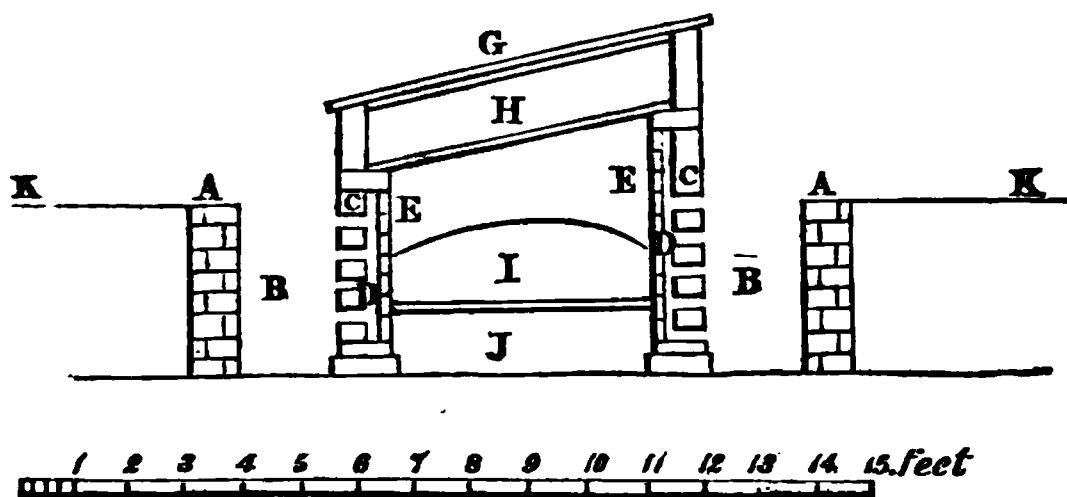
There is a cavity under the bed (c) into which the steam from the dung lining is admitted ; posts of iron or stone (b) support



this bed (d), which is made of slate, stones, or tiles ; while the cavity between, and the sides of the pit, are closed below with slabs of stone (e). The pit is heated by dung linings (f), inclosed by walls (g), and kept dry by drains (h), and by a gutter to the saabes (i). The plants are inserted in a hill, and gradually earthed up in the usual manner. This pit is much cheaper than Mc.Phail's, especially if the retaining walls (g) are omitted. (*Gard. Mag.* i. 170.)

Mr. Mills' pit, heated by fermenting dung without admitting the vapour and gases from it to communicate with the plants, is constructed as follows :—
 A, nine-inch walls inclosing dung linings ; B, cavities to be filled with linings ; C, five courses of four-inch work pigeon-holed ; D, cavity in chamber filled with heated air ; E, brick-on-edge partition excluding fumes of the dung ; G, frame ; H, trellis for training plants

on ; i, earth for planting in ; j, cavity filled with



large wood ; k, ground level. (*Mills' Treatise on Culture of Cucumber*, 1.)

Instead of dung, even in Flannagan's and Mearns' pits, *bark* might be employed as a source of heat, but in the following system, practised by Mr. Barton, the gardener at Springfield, near Liverpool, bark is especially used in conjunction with fire heat. The pit is 48 feet in length by 10 feet wide, heated by a common flue. A bark bed, of four feet wide, is filled to two and a half feet with fresh tanner's bark ; upon this a thin layer of rotten dung is placed, upon which is put a layer of the top spit of a piece of pasture land, broken fine with the spade. This brings the surface of the bed to about two feet from the roof of the pit. The plants are fastened to stakes till they reach a trellis which is fixed six inches from the glass, and upon which they are trained. Mr. Barton commences forcing the latter end of January, and very little air is given during the growth of the plants. If

it is found requisite to admit air, it is done early in the fore part of the day. The temperature is made to range from 75 to 80 degrees, as near as practicable, and the plants are syringed early in the morning and again in the afternoon. By this method fruit are cut by the first week in April. (*Gard. Chron.* 1843. 336.)

Fire heat, unassisted by fermenting bark, may be employed to maintain the requisite temperature; and the following plan is as simple as it is economical, requiring only an excavation $2\frac{1}{2}$ feet deep, and of the length and breadth of the frame, to be first dug out; in this a flue of brick or any other material is carried along, nearly on one side of the pit, from a furnace at one end, and returns on the other to a chimney carried up over the fire-place. Posts are driven at the corners, and intermediate ones at the back and front. On these posts is laid a stage of wattled (*i. e.* wicker-work) hurdles, closely enough woven to prevent the mould of the bed from falling through. (*Gard. Mag.* iv. 362.)

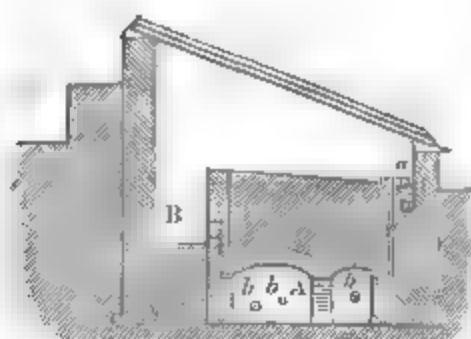
On this platform a frame of sufficient depth is placed, and within this a bed of suitable compost, 18 inches thick, is put for the plants. By this trifling structure and simple means, a perfect command of heat is obtained, at very little expense; and where proper skill is applied, and the necessary degree of moisture is obtained, in connection with the fire heat,

there is no doubt of a successful result. When the required heat (70 degrees) is found in the frame, a damper, fitted at the bottom of the upright chimney, is shut, thereby confining the heat in the flue and heat chamber, which is further regulated by ordinary coverings. (*Ibid.*)

Hot water is now very frequently employed as a source of heat, and I think it is much more manageable than any other, though more expensive than dung, for the same purpose. It may be applied by means of pipes or a tank.

Pipes. The following is the pit employed by Mr. Mitchell, at Worsley Gardens, and secures these four desirable objects: 1. A circulation of air without loss of heat. 2. The command of a supply of moisture proportioned to the temperature. 3. The desired amount of bottom heat. 4. The necessary supply of external air without producing a cold draught. The method by which the first of these is secured will be understood by referring to the section annexed, in which *a* is the flow pipe, *b b b* the return pipes in the chamber A. It is evident that as the air in the chamber becomes heated it will escape upwards by the opening near *a*, and the cold air from the passage B will rush in to supply its place; but the ascending current of heated air coming in contact with the glass is cooled, descends, and entering the passage B, passes into the chamber A, where it is again heated; and

thus a constant circulation is produced. In order to obtain the second object, to some extent the tank and pipe systems are combined. The flow pipe *a* is put half its diameter into the channel *c*, which, when filled with water (or so far as is necessary), gives off a vapour exactly proportionable to the heat of the pipe and pit.



The third requisition is produced by the surrounding atmosphere and heating materials. The fourth is accomplished simply by lowering the upper saah; the cold air thus entering at the top only, falls directly into the passage *B*, and passes through the hot chamber before coming in contact with the plants. In order to test the circulation, a piece of paper, fixed near the front of the pit, shewed the current to be so strong as to bend it backwards, and give it a tremulous motion. When the heat in the chamber is 95 deg., in the open space over the bed it is 71 deg.; in the bottom of the passage only 60 deg.; and in the mould in the bed it is 80 deg. (*Ibid.*)

Tank. This has the advantage over pipes of re-

taining its heat through the night better ; but the combination of the two is, perhaps, the best which has been suggested. It was designed, and is employed, by Mr. Green, gardener to Sir E. Antrobus.

The construction of the pit is as follows :—the walls are built of 9-inch brickwork, five feet in the back, and two and a half in the front, and five feet wide in the clear, thirty-six feet long, covered with nine lights, and divided into three compartments. A trough of brickwork is carried along the bottom from end to end in the centre ; this is constructed by first laying two bricks thick one foot wide, and then forming the two sides of the trough with bricks on edge, the whole being so cemented as to hold water.

The pit is heated with hot water by means of a branch of two and a half inch pipes proceeding from the boiler, which heats a stove at a short distance. The hot water flows along the back and front of the pit, but the return pipes are placed in the trough first described, which is filled with water, or partly so, as circumstances may require, by means of a small pipe that leads to the outside. Another small pipe is laid in the bottom of the trough for letting off the stagnant water, and for emptying it occasionally ; for in very dark damp weather a drier heat is required.

The soil that Mr. Green uses, is collected at least six months before it is wanted for use, and consists of

turf, not more than three inches thick, of strong maiden loam, built up in narrow ridges, with a layer alternately of an equal quantity of fresh horse-dung, and a good portion of straw. When wanted for use it is chopped up with a spade, is not sifted, and one-third of well-decayed leaf mould is added.

In order to have a succession of fruit, Mr. Green sows the seed at three different times, the 1st and 20th of September, and the 5th of November. The plants of the first and second sowing are fruited in No. 2 pots, and of the third are planted out. In placing the plants in the fruiting pots, a quantity of large potsherds are put at the bottom, with some large pieces of turf and dung, in order to insure a good drainage. The plants are put sufficiently deep to leave three or four inches of the top of the pot, so that the plants may be earthed up as they advance in growth. When the pots are filled with roots, a good supply of water is given, of the same temperature as that of the air they are grown in.

One plant is placed in the centre of each light, care being taken that the bottom of each pot is about four inches above the water in the trough and the return pipe. The branches are trained on a temporary trellis, and the fruit is allowed to hang down. From the plants sown on the 1st of September, the first fruit is cut in the first week of November; from that date to the 4th of December, it is not unusual to cut

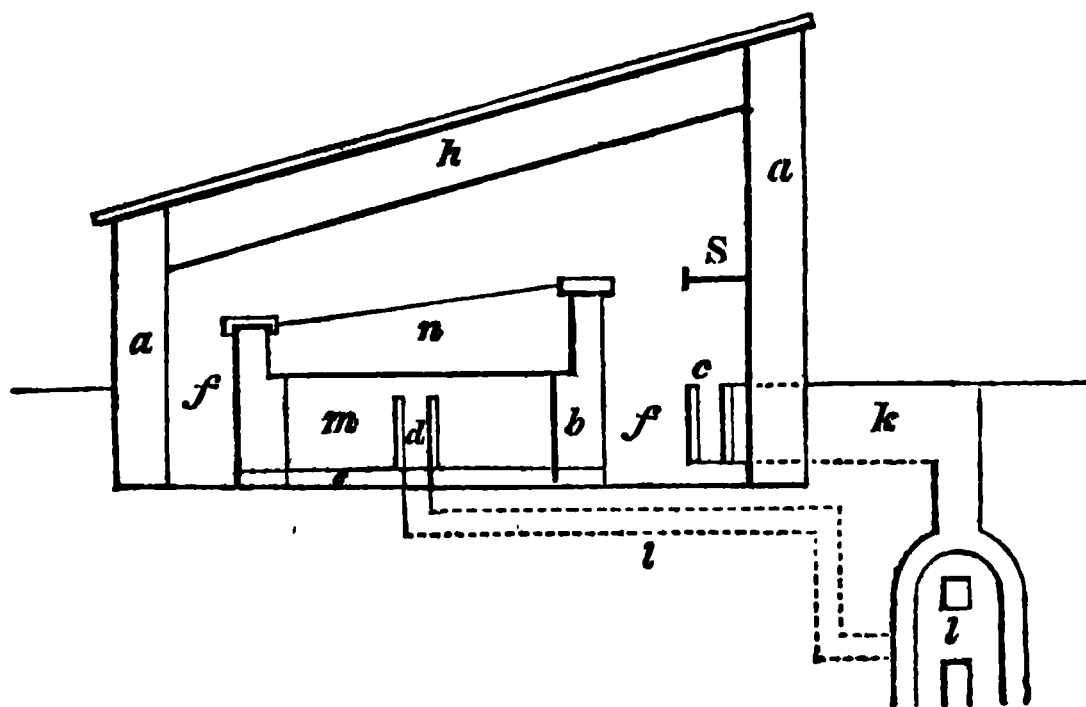
from three lights, or three plants, forty cucumbers of the Sion House kind, varying from twelve to fifteen inches in length. The same plants will continue bearing till about Christmas. The plants of the first sowing are thrown away at Christmas, and plants of the third sowing are planted out in their place. The plants of the second sowing are productive from December until March ends. When the plants are grown in a bed, Mr. Green forms the bottom of it by laying some strong stakes across the trough, and covering them with any rough boards. The stakes so laid will leave a cavity round the back and front of the trough, so as to allow the heat and moisture to rise. The plants are put on a narrow ridge, and earthed up in the usual way as they advance in growth, and the branches are trained upon a trellis, in the same way as for the plants in pots. These plants will bear well through the spring and summer months.

As soon as the first three lights can be spared, Mr. Green introduces shelves fifteen inches from the glass, and fills them with strawberry plants, and the pit answers equally well for them as for cucumbers ; only for strawberries the water in the trough requires to be stopped off, which is done by means of a stuffing-box. The plants, of course, require a great quantity of air both night and day at first.

The advantages gained by this pit are a great

saving of labour and dung, which last, at all times, makes a very littery and unsightly appearance ; the having a sufficient command of heat in severe and changeable weather, and the return pipe being buried, or partly buried in water, gives, when required, a sufficient bottom heat ; and the constant vapour arising from it renders the plants so healthy and strong, that a good crop of fine fruit is certain. (*Gard. Chron.* 1841. 36.)

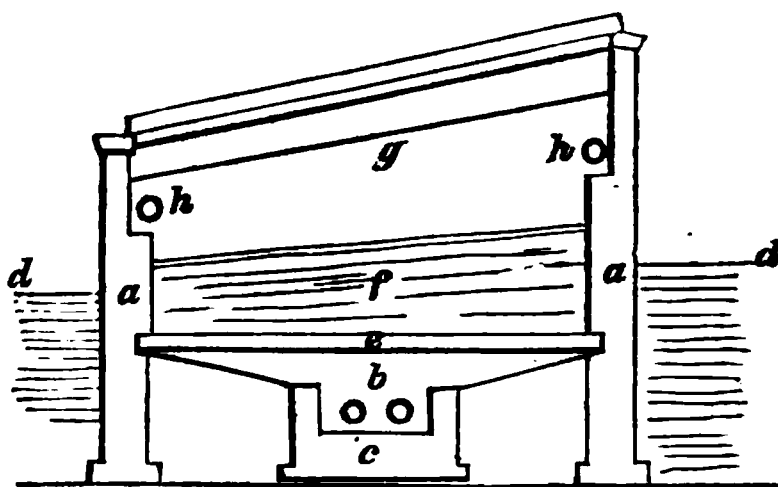
The following are the plans of pits invented respectively, by Mr. Cobbett, of Pencarrow, and Mr. Green. The first being heated by open troughs containing the hot water :—



a, Walls of pit ; *b*, walls of bed ; *c*, trough for heating air of the pit ; *d*, trough under the soil, in the air tight chamber *m* ; resting on the openings *e*, for con-

veying the cooled air from the front walk to the trough *c* to be heated ; *f*, walks ; *S*, shelf for plants ; *h*, trellis for the cucumber vines ; *i*, return pipe for the hot water ; *k*, the trough, at entering the pit it is closed ; *l*, Shewin's conical boiler ; *n*, soil for cucumber roots. (*Duncan's Culture of the Cucumber*, 22.)

GREEN'S PIT.



Scale, 1-6th of an inch to the foot.

a a, outer walls ; *b*, hot water pipes, in a brick trough, *c* ; *d d*, ground level ; *e*, joists, forming floor of pit ; *f*, bed for planting or plunging ; pipes may pass up through this, to admit moist air as required from the chamber below ; *g*, the trellis ; *h h*, hot water pipes for top heat. (*Suburban Gardener*, 506.)

Mr. Cuthill, florist, of Camberwell, very justly adverts to the ill consequences of building brick pits for cucumbers, &c., later than July or August, lest the

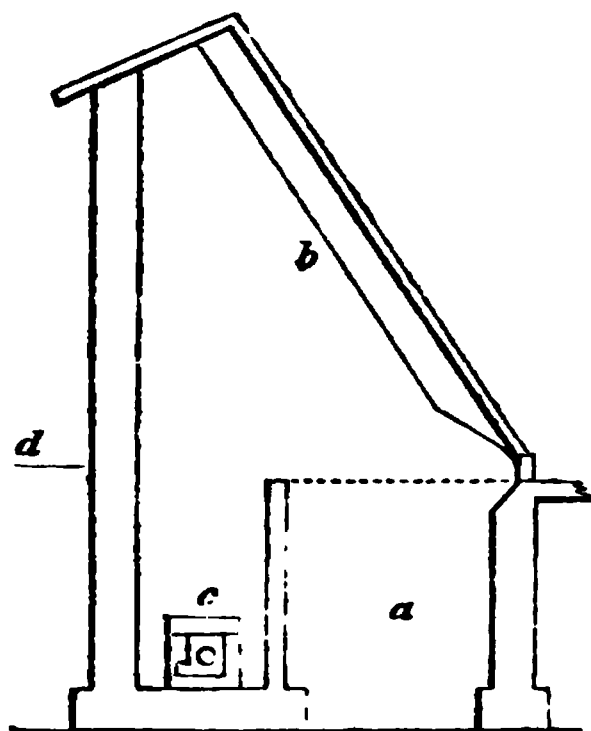
mortar should not be thoroughly dried. If this is not attended to, the mortar, when heated by dung, will often emit a noxious vapour that destroys the young plants. Mr. Cuthill strongly recommends solid sides to brick pits, instead of pigeon holes, because he is able to apply hot fresh dung immediately to the walls in the former case, and in the latter it is necessary to sweeten it. He states, that in such pits his early melons, sown on the 1st of February, have been cut in the first week of May. In winter, for cucumbers, he thinks no plan equal to Mr. Green's. (*Gard. Chron.*, 1841. 150.)

Stove Culture is the most elegant, most certain, and least troublesome, for growing the cucumber in perfection.

Mr. Ayres has erected a stove devoted to its cultivation, and, as for this purpose it is most desirable to obtain the greatest amount of solar influence during the winter months, he has the glass placed at an angle, much nearer to a right angle than is usually employed for the cucumber pits or frames. He has selected the angle of 51 degrees, but I think that from 55 to 61 degrees would be even preferable.

The following is a sketch of Mr. Ayres' stove, on a scale of a quarter of an inch to the foot : *a*, is the tan-bed, in which the pots containing the plants are plunged ; *b*, is the trellis to which the plants are trained ; *c*, is the pathway, under which

is a flue, with the pipe of an Arnott's stove passing through it ; and *d*, is the ground line.



The Arnott's stove must stand in a vault, accessible from without, about a foot below the level of the bottom of the flue, to secure a good draught to the fire. The flue should be divided into four compartments, the first and third of which, by keeping the pipes wholly, or partially immersed in water, might be made to produce moist heat, while the others will produce dry heat ; so that by tilting or removing the covering tiles of any of the compartments, the humidity of the atmosphere will be placed quite under the command of the attendant. The cost of the stove and piping to heat a house of the above dimensions, and twenty feet long, would be no more than £4 10s., and in the most severe weather, with the

assistance of the bark bed, it would maintain a temperature of 65 or 70 degrees for about sixpence per day; and in ordinary weather, it would not cost more than from eighteenpence to two shillings per week. A stove of this kind, with Welsh coal, would not require attending more than four times in twenty-four hours.

Mr. Ayres uses, turfy loam, two parts; thoroughly decomposed dung, two parts; leaf mould, two parts; and very sandy turfy peat, two, but not sifted. Manure water is prepared by steeping two pecks of sheep or deer dung, one peck of pigeon's dung, and a half a peck of soot, in a hogshead of boiling rain water, and used, alternately, with clear water from March to October. The great secret of keeping the cucumber in vigorous growth in pots, Mr. Ayres conceives, is the use of manure water. The plants should be raised from seed sown on the 1st of August, so as to be fit for planting, in fruiting pots, in the first week of September. These pots should not be less than sixteen inches wide, and eighteen inches deep. Two plants to be placed in each pot, but the leading shoot must not be stopped, but allowed to grow until it reaches to the top of the house. On this, success in pot culture mainly depends, for if the plants are stopped, they are thrown into a bearing state before they are sufficiently established, and the consequence is, early fruit, but a short-lived plant; but if the

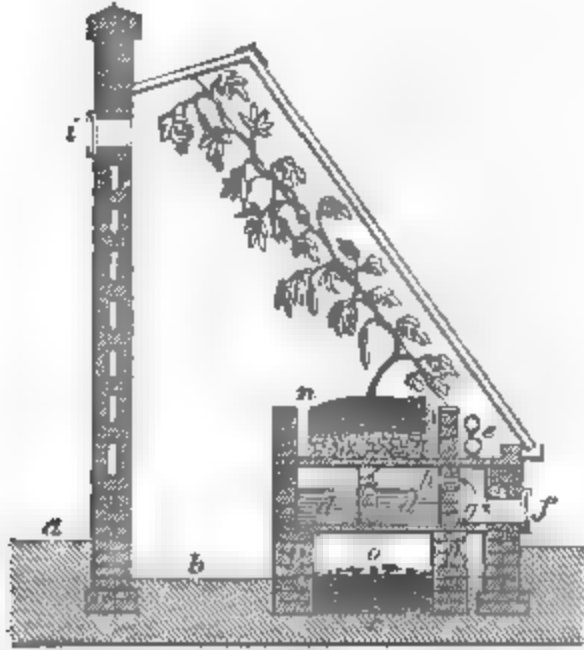
allowed to grow to the length of ten or
 before the leading shoot is stopped, a
 quantity of true sap will be generated, and the
 consequently, will be better able to support a
 if it had been allowed to bear fruit before
 properly established (p. 12). The tempera-
 Mr. Ayres approves of, is 60 degrees
 the night, 65 degrees in dull, and 70 de-
 clear weather, by fire heat ; and 80, 90, or
 degrees, with plenty of atmospheric mois-
 , in sunny weather. The two shoots from
 plants in each pot are to be trained to the
 one foot nine inches apart ; and when they
 and out laterals, these must be stopped at
 above the fruit. (*Ayres' Cucumber Culture*
 12.)

of employing pots, it would be a better
 in earth, resting upon the tan, or with
 bottom between. The roots would thus
 room for their roots to pasture in.

Moore, one of the most scientific, and yet
 gardeners of the present time, has suggested
 an improved form and mode of heating the
 stove by hot water. He has also adopted
 growing without pot-culture.

use should be provided with a tank near
 which a circulation of heated water would
 nial warmth to the soil and the roots : at-

tached to the same boiler which heated the water in this tank, a series of pipes might be so arranged as



a, Ground level. b, Pathway. c, Lowest point excavated, on which a bed (o) may be made for rhubarb, &c. d, Tank, supported by brick piers (p). e, Pipes for the supply of atmospheric heat. f, Apertures for the admission of air, which passes through the chamber g, into the tank, by a series of openings at h, and thence into the house by the tubes m, escaping through the ventilators i. m, Bed of soil on which the plants grow.

to supply heat to the atmosphere above the tank, which should be constructed so as to be as near the glass as circumstances would admit: a shallow bed of soil to be placed, resting on a due portion of open rubble for drainage; the upper surface of the tank rendered level, so as to admit of water being poured in quantity among the loose drainage, which would ultimately, by the agency of the heat below, be induced to raise among the soil in the form of

vapour, and thus duly to supply it with moisture. Beneath the tank, an open space would admit of mushrooms or rhubarb, &c., being cultivated with facility. The admission of air would be provided for by apertures through the front wall, communicating with the upper part of the tank above the level of the water; from thence small tubes would rise at intervals through the soil into the house, and this might be opened or closed at pleasure; the outer orifice would be provided with small sliding shutters, to exclude the external air when not required. By this arrangement the cold air would pass over the surface of the heated water, and become not only warmed in its progress, but also supplied with an amount of moisture proportionate to its rarefaction, and the evil resulting from the admission of cold dry air will thus be altogether prevented.

The plants are to be trained on a trellis placed about 15 inches from the glass, and their roots confined to certain portions of soil, which should from time to time be replenished. This might easily be accomplished by various arrangements; a few slates placed about each plant would serve as one simple means of effecting it. Transverse divisions must be introduced so as to allow of the removal and renewal of a plant and its soil without disturbing its neighbours; a complete succession might thus be effected. The structure itself would exteriorly be

protected with shutters of light frame-work, covered with painted or tarred canvass. These should be kept about six inches from the glass, and thus a cavity would be formed, the air contained in which would serve to prevent that incessant drain upon the temperature of the house which takes place either when the covering is in contact with the glass or when altogether absent.

Next in importance and usefulness to a house such as is described, Mr. Moore recommends a pit heated in a similar manner, as being equally suited to accomplish the end in view, though somewhat less convenient in its application to practice. The principal difference between the house already referred to and such a pit would be the omission of the pathway at the back; and that the tank would occupy the whole width of the pit, except, perhaps, a cavity of six inches on either side, or else (which would be equally effectual) the improvement already described in this work might be adopted. The plants would be trained on a trellis near the glass, and be grown in shallow beds of soil above the tank. (*Flor. Journ. and Gard. Record*, 1845. 49.)

Mr. Moore gives the following directions for training in a house:—The plants being intended to occupy a surface of trellis-work in a line nearly parallel with the glass, it will be requisite to train their primary shoots to a sufficient length to reach from the

soil to the trellis, before they are what is technically called 'stopped;' this operation, by removing the central bud, or axis of development, induces the buds which are latently formed at the nodes of the branches to push forth and become the axis of further extension. Two or three of the strongest of these lateral shoots, situate towards the top of the stem, should be retained, and trained on the trellis in a direction towards the top of the house: these shoots should be placed about 18 inches from each other, and when they reached about one-third of the length of the trellis they also should be stopped, and thus several more lateral shoots will be produced. The uppermost strong shoot should in each case be still trained in the same upward direction, and the others must be disposed in the most convenient form in the space between the main branches: these, that is the growing lateral shoots, if they do not show a fruit blossom at the second joint or leaf from the main branch, must be stopped, and the young shoot thus induced to push forth will in all probability have fruit at the first leaf; if not, it must be stopped at every leaf as it extends, until fruit is observed. The upper portion of the branch, after having extended about one-third further up the roof, should be submitted to the same process; and this must be again repeated until the whole of the trellis is covered. No reference has yet been made to the treatment of those lateral

branches where the young fruit are perceived : these should be permitted to grow until the blossoms have expanded ; and then, after this, they should be stopped at the leaf next beyond the fruit blossoms. By permitting them to grow until the flowers have expanded, the attraction of the growing branch will continue to draw up a regular supply of nutriment, part of which will be devoted in its course to assist the development of the blossoms ; and besides the advantage of the growing point acting thus as a sucker to draw onwards the vital juices towards the young fruit, it will act also as an outlet to draw off what would otherwise be superabundant and dangerous to these tender organs of reproduction. (*Moore's Theory and Practice of Cucumber Culture*, 33.)

The following are also useful suggestions :

Let the house be constructed as follows : The back wall 9 feet high, and the front 4, above the ground level ; a door as near the back wall as possible, and at one end of the house ; the inside to be 10 feet wide, and heated with large flat hot-water pipes, cast with dishes on their upper surface for holding water. Let boxes be made 3 feet long, 14 inches deep, and 16 inches wide : the house will hold two rows of such boxes. In placing them where they are finally to remain, be careful to place them at a sufficient distance from the glass to admit of watering the root and adding fresh soil. Seeds sown on the 1st of August will

produce plants to bear during November, December, and January ; for plants to succeed these, sow on the 1st of September ; these plants should not be allowed to bear till the beginning of February. The soil to be light fibrous loam ; add to this one-fourth of leaf-mould and rotten dung, of equal parts ; place large potsherds over the holes in the bottom of the box ; above the potsherds a layer of turf. Make a small hill in the centre of each box ; place one plant in the centre, and continue to add soil as the roots appear on the surface, taking care not to fill the box with soil till the plants are in full bearing. Water with manure water, occasionally with a little soot mixed with it. A temperature of 65 to 70 degrees by night, and 70 to 85 degrees by day (with assistance of sun), during winter. If the plants should flag about noon, as they frequently will during sunshine, sprinkle them with water immediately over the leaves ; and as the spring advances, shade them lightly during the middle part of the day. Be careful to maintain a moist atmosphere by vapour from the pipes and frequent syringing ; at the same time guard against over-watering the roots. To banish green-fly, use tobacco-water applied with the syringe ; let it remain on the plants 20 minutes ; afterwards syringe the plants with clean water. Give air every opportunity, but do not admit any in front of the house in cold weather. Plants under the above treatment have been

kept in a bearing state for twelve months from seed sown on the 1st of September. (*Gard. Chron.* 1841. 117.)

Although a stove purposely erected for cucumber culture is to be preferred, yet it is not essential for its success. Mr. James Reed, of Bristol, employed a house built for grapes. This vinery was 40 feet long, 16 feet broad, 12 feet high at the back, and $5\frac{1}{2}$ feet high in the front; with one fireplace, and a flue which passed round the house. The air could be admitted both by the top and front lights. On or about the 20th of September, cucumber seeds were sown on a moderate hotbed in the open air, and treated in the usual manner till they were ready to ridge out. This generally happened about the beginning of November, at which time the shoots of the vines were withdrawn from the house, and a dung-bed formed on the floor in the usual way. After placing the frame and earth on the bed, it may be left without the lights till the rank steam has passed off; and the plants being placed in the hills, and the sashes put on, the following are the leading features of management during the winter: Make fires in the evening, so as to warm the air of the house to from 56 to 60 degs., and in very severe frosts it may be raised to 70 degs. In the mornings of the coldest weather and shortest days make a strong fire, so as to raise the heat to nearly 70 degs. when the house is shut up. About

eight o'clock, and from that time to half-past nine, give plenty of fresh air, by opening the front sashes and top lights; after which, and during the remainder of the day, give plenty of air to the cucumbers, by tilting the sashes in the usual way. In mild weather, and during sunshine, the lights may be taken entirely off for some hours each day; and, immediately after forming new linings, the top lights may be left down a little all night, to permit the escape of rank steam. The advantage of this mode of growing cucumbers during winter is the comparative certainty of an early and good crop, at one-third of the trouble and expense of the common method out of doors. By this practice, fruit may be cut in January. The vines may be introduced in the beginning of March, and will break regularly in consequence of the genial steam of the dung. In April, the shade of the vine leaves will have rendered the house too dark for the culture of the cucumber; and as, by this time, cucumbers are plentiful in the common hotbeds out of doors, the bed in the house may be cleared out, and the vines treated in the usual way till the following November. (*Gard. Mag.*, iii. 23.)

Cucumbers may be grown, according to the foregoing plan, in a peach-house, as well as in the vinery.

Mr. Duncan says, that in cucumber houses there should be shelves exclusively devoted for pots or

boxes, near the glass, in the immediate influence of the sun's power.

In stoves, or vineries, or any other house, where cucumbers are grown in winter, there should be a similar contrivance; but in those periods of the year not directly winter, it does not so much signify where they are placed, so that they enjoy the influence of light, and proximity to the glass.

It is further evident, that cucumbers may be grown, in the summer, in the green house, especially such sorts as are extremely valuable, and when other convenience is deficient.

The usual temperature required for annuals, such as balsams, cockscombs, &c., is quite sufficient for the growth of cucumbers during a considerable period of the year. (*Duncan's Culture of Cucumber*, 76.)

GENERAL CULTURE.

Earthing the Beds.—When the earth is put on for frame culture, it is at first to be spread only two or three inches deep, but under the centre of each light a hillock must be constructed, eight or ten inches deep and a foot in diameter. The earthing should be performed at least four or five days before planting, at which time the earth must be examined; if it be of a white colour and caked, or, as it is technically termed, burnt, it must be renewed, for the plants will not

thrive in it, and holes bored in the bed to give vent to the steam.

The mould of the hillocks being well stirred, the plants must be turned out of the pots without disturbing the ball of earth, and one containing three plants inserted in each ; a little water previously heated to the requisite temperature must be given, and the glasses kept perfectly close until the next morning. Any plants not in pots must be moved by the trowel with as much earth pertaining to their roots as possible. The shade of a mat is always requisite during the meridian of bright days until the plants are well established. They must be pressed gradually away from each other, until at least eight inches apart ; nothing can be more erroneous than to allow them to proceed with the stems nearly touching.

When well taken root, earth must be added regularly over the bed, until it is level with the tops of the mounds ; for if there be not a sufficient depth of soil, the leaves will always droop during hot days, unless they are shaded, or more water given them than is proper.

Pruning and Training.—An important operation for the obtaining early fruit, but by no means so necessary for later crops, is the first pruning, or as it is termed, *stopping* the plant, that is, nipping off the top of the first advancing runner, which is to be done as soon as the plant has attained four rough leaves : this prevents

its attaining a straggling growth, and compels it at once to shoot out laterals, which are the fruitful branches.

Mr. Duncan's directions relative to stopping are very judicious. He says, in November and December, while the influence of the sun is little, and the excitability of the vital principal feeble, the attempt to stop or interfere with the organism of the living plant should not be made, unless there is good proof that other shoots will be emitted at the axils of the ones stopped. But plants in a young state, in spring, should be stopped at the first joint from the cotyledon, and afterwards at the second. Their being fruitful or otherwise in the early part of their life, will depend in a great measure upon a proper performance of this operation. Plants intended for trellis culture should not be stopped until they have attained to a proper height, the distance from the soil of the bed to the trellis being necessary. The terminal bud, and every one below the three top ones, should be removed, and the shoots emitted from these will become the skeleton of the future system of branches. The tendency to elongate being invariable, should be as constantly directed to foreseen circumstances, maintaining a healthy vigour, and fine and abundant fruit, both in accordance with the known principles of vegetable physiology. Every useless or not required bud should be rubbed out immediately it is evolved, and every

shoot superfluous or unnecessary removed with the fingers, the knife being required only in removing a denuded or worn out branch in a later age of being, and to cut the fruit. The shoots with fruit should be stopped at the second joint beyond, as soon as the fruit is out of bloom. The shoot emitted at the fruit, and the one before it, must be rubbed away ; and should there be one behind it, that should be stopped, not removed ; but the shoots emitted at the terminal bud, and others on other parts of the plants, must be encouraged to proceed unstopped to succeed in a similar way, proportioning their number and the number of fruit to the powers of vital excitement and extent of elaborating organs, not taking into calculation the decaying foliage. (*Duncan's Culture of the Cucumber*, 41.)

When the plants begin to run, if a trellis is not used, the shoots must be trained and pegged down at regular distances, which not only prevents their rubbing against the glass, but also becoming entangled with each other. Never more than two or three main branches should be left to each plant, all others to be removed as they appear. If more are left it causes the whole to be weak, and entirely prevents the due exposure of the foliage to the sun.

For attaining this last named object, as well as to obtain fruit unstained and of a uniform colour, it is by far the most preferable mode of training to have

the branches supported on a wire trellis at a regulated and equal distance from the glass.

To promote the admission of light in fine days in winter, says Mr. Duncan, when it is calm it is very beneficial to clean the inside of the frame, by washing and wiping, using a little warm water and a sponge, and once a fortnight, or as often as required, the lights too ; these must be removed to a distance, and well syringed and washed with a soft brush ; and before they are put on again allowed to dry.

While this is being done some other lights must be put on in their stead ; but preferably to this, if it be convenient, is to use two sets of lights, one to be at rest and the other in use alternately every fortnight or three weeks. (*Ibid.* 54.)

The training must be regularly attended to, and all superabundance of shoots and leaves removed. If the plants which have been once stopped have extended their runners to three joints without showing fruit, they must be again stopped.

As the fruit advances, if not trained on a trellis, tiles, sand, or other material must be placed beneath it to preserve it from specking, or a glass cylinder is still better ; if a bulb containing water is attached, the fruit grows faster and finer.

Temperature and Ventilation. The greatest care is necessary in regulating the temperature ; it must never be allowed to decline below 70 deg. or rise

above 95 deg. The temperature of the bed, as well as of the exterior air, governs also the degree of freedom with which the air may be admitted; whenever allowable, the glasses should be raised. The best time for doing so, is from ten to three o'clock.

It may not be misplaced to remark, that chilly, foggy days are even less propitious for admitting air than severe frosty ones; during such it is best to keep the frames close, and to lessen the opening of the glasses, in proportion as the air is cold or the beds declining, it never exceeding two inches under the most favourable circumstances. (*Johnson's Mod. Gard. Dict.*)

The following is the best mode of keeping up a current of warm dry air through the frame. This not only increases the health of the plants, but diminishes greatly that condensation of moisture on the glass, which is so prejudicial, and renders the raising of the lights unnecessary, except in the most favourable times. The plan was originally proposed by the celebrated vegetable physiologist, Dr. Hales. (*Lewis's Newman's Chem.* i. 411.) The mode succeeds on the principle that warm air ascends; and this is secured by a pipe passed through the body of the bed, or other source of heat, one of its apertures communicating with the exterior air, and the other opening into the frame; at one of the top corners of which an aperture or pipe, with a cap to close it when

necessary, must be made ; the damp heated air of the frame constantly issues through this aperture, and its place is supplied by that which rises through the pipe. This suggestion was adopted by Mr. Keith, of Ravelstone, who states that he employs a leaden pipe of two or three inches diameter, bent nearly at a right angle, each limb being three feet long. One limb is placed horizontally in the body of the bed as it is forming, with the pipe's mouth extending in the open air, the other mouth opening into the frame. A cap should be fitted to the outside mouth, and if there be a slit in the side of the cap, (to be kept downwards when used,) the quantity of air admitted can be regulated. (*Mem. Caled. Hort. Soc.* iii. 185.)

Towards the conclusion of the first production of fruit in dung beds, it is a good practice to renew the heat by adding eighteen inches of fermenting dung all round the beds, previous coatings being entirely removed, and to earth over it to the same depth as in the interior of the bed. This prevents the roots, when they have extended themselves to the sides of the bed, being dried by exposure to the air and sun.

The fullest and most practical directions for the management of linings has been published by Mr. G. Mills. He says, linings should be turned over once in eight or ten days, to keep them in a regular state of fermentation, especially from November to Febru-

ary inclusive. They should not, however, be all turned at once ; and if the back lining is turned, we will suppose, on the first or second, the frontage should be done on the fifth or sixth ; so that one-half is turned in five days. The ends will not require turning so often, provided the heat keeps up to what is necessary, according to the season. To dry the inside of the frame in December, January, and February, let the linings be four or five inches above the level of the surface of the bed, which will be sufficient. In March and April they may be lowered in proportion to the increased power of the sun's heat. It may appear unnecessary to some persons to have the linings turned so often ; but on the lively heat emanating from them the well-doing of the plants depends, especially when the heat of the bed begins to decline ; and in proportion as attention is bestowed on them will be the success of the cultivator. If they are allowed to be undisturbed until they heat themselves dry, they become useless ; and the same effect is produced if they get overcharged with moisture. In both cases, if not rendered entirely useless, they will take so long a time to recover their heat as to render them next to valueless ; for where a warmth is requisite, in addition to that of the bed, the plants may be lost in the interval between the turning and re-rising of the heat. During the operation of turning should there appear any part too much decayed,

let it be removed, and its place filled with fresh linings, which should be put on the top of the old, in order to draw up the heat from it, and to keep up a good warmth round the frame; besides, when the new linings are above the bed there will be no danger of their rank steam getting to the plants. When the linings are again turned, the fresh manure applied must continue at the top; and, if necessary, some more must be added to it, in order that the right height may be preserved. It must, however, be observed, that the new linings should never be allowed to mix with the old ones until they have become quite sweet; for you must on no account allow rancied heat to be confined at the bottom of your linings. Attention to these directions must be continued until June, if it is desired to keep the plants in a healthy state; and although after the month of March the turnings need not be quite so frequent, a good warmth must be kept up, or the plants will not swell off their fruit kindly. Indeed, at an advanced period of the season, the roots will have got down into the dung; and as soon as that ceases to heat, they will perish from excess of moisture. (*Mills' Treat. on Cucumber*, 33.)

As the spring advances the glasses may be often taken off during mild days, or even to admit a light temperate rain. In June or July, according to the geniality of the season, they may be removed finally from beds and pits; and even before, the frames may

be raised on bricks, so as to allow the runners to spread at will.

As it is important to keep up the temperature by linings, so must the unhealthy reduction of temperature within the frame at night be prevented by coverings placed over the glass. By preventing cooling, the necessity for increased heating is removed. The best mode of covering is to spread a little hay over the glasses ; and to keep this in its place, as well as to exclude all wet, to place over it a coverlid of the asphalte cloth, which costs only a penny per square foot, and will last for years.

Mr. Duncan says that coverings of sugar-mats are the best ; being thick, they do not lie close upon the glass, and being bad conductors prevent the radiation of heat from below ; they are of a small size, and may be easily put on and removed ; or, in milder weather, the spare lights of other frames may be used with advantage, particularly if the wind should be cold in the day. Cover the last thing at night, and uncover the first thing in the morning, under circumstances of a usual nature ; but in extreme cases, such as frost, &c., of course it is done sooner and continued to a longer time, but never longer than eight or half-past eight o'clock. Mr. Duncan covers the middle of the glass only, lapping the mats over each other if necessary, but not else : a single one, merely covering the centre of the light, he says, is frequently all that

is necessary ; but when extremely cold, cover the whole glass. (*Culture of Cucumber*, 57.)

Watering. Water is usually required two or three times a week ; it must be warmed as before mentioned previously to its application. Instead of watering the inside of the frame, it is a good plan to do so plentifully round the sides, which causes a steam to rise, and affords a moisture much more genial to the plants than watering the soil.

The quantity necessarily varies according to the circumstances of temperature and season. In wet, dull and cloudy weather, much less moisture is required by the plants than in bright sunshiny days. A common three-light frame, in good health and full bearing, will require eight gallons of water five evenings out of seven in very hot weather, such as we experienced in July ; but sometimes, in dull weather, this quantity will serve them a week. (*United Gard. Journ.* 1846. 599.)

Mr. Mills, in his excellent “Treatise on the Culture of the Cucumber,” says, watering frequently, and in small quantities, is the proper way to keep the plants in a sound state ; but in the winter months, from the moisture of the fermenting material, and the absence of solar heat, they will require but little from the water-pot. The surface of the bed, near the frame, will occasionally become dry from the heat of the linings passing upwards through it ; and when

that occurs, let it be sprinkled with water, through a fine-rosed pot, just before covering up; and on fine mornings, about ten o'clock, give to the soil in which the plants are growing a little water in a tepid state. In November, December, and January, little water will be wanted, but in February, March, and April, more may be given; always, however, in the morning, and only when there is a prospect of the plants becoming dry by covering-up time. It is a bad practice to water late in the afternoon, even in April, May, and June, as the confined air, during the night, causes the damp to settle on the blossom of the fruit, when it destroys the pollen; and fruit so injured will seldom swell freely. If the soil within the frame be moderately moist, it will be sufficient for the night without late waterings. Where a doubt is entertained on this point, give a little to the sides of the frame, and not to the plants. In dull weather never water the plants, but the earth only.

Impregnation. Of late years it has been denied that impregnation is necessary for the production of fruit. That it is absolutely required, where seed is to be obtained, no one disputes. Mr. W. P. Ayres says, that so far as the production of fruit is concerned, impregnation is "neither good nor harm," and cites, in proof of this, a brace of fruit, which he cut on the 8th of February, 1840, each nineteen inches long, which had never been impregnated; for,

at the time the female flowers were expanded, there was not a male blossom on the premises, and consequently no impregnation could take place.

Since that time, he has cut hundreds of fruit, the flowers of which never expanded, and the same has been done by several of his acquaintances. In fact, Mr. Wilson, Mr. Spivey, Mr. Judd, and the Messrs. Ayres, will undertake to procure, at the May *fete* of the Horticultural Society, from ten to twenty brace of fruit, as good as can be obtained by impregnation, the flowers of which shall be removed from the fruit before there is any chance of their being impregnated.

Where long fruit is desired, Mr. Ayres thinks, impregnation is positively injurious, because, if seed is the result of impregnation, the energy of the plant will be expended in perfecting the seed, instead of in the production of fruit, as every practical man knows that the production of one seed from it will weaken the plant more than a dozen of fruit fit for table. There are instances in nature, of plants perfecting their fruit without impregnation, as in the different varieties of figs; and why not the cucumber do the same? (*Gard. Chron.*, 1842. 172.)

Another practical gardener, Mr. Kyle, says, some years ago, as he was pegging down some plants, he broke the flower off the fruit, at least four or five days before it would have expanded. He left it, however, and, to his agreeable surprise, it swelled off as handsome a fruit as any he had during that season.

From that time he has never taken the least trouble respecting impregnation, unless when wanting to save seed. (*Ibid.* 1842. 237.)

Mr. W. Charlton gives similar testimony, for he says, some of the finest fruit he ever grew never opened a blossom. In one instance, he broke off the unexpanded corolla, and the end of the fruit, notwithstanding which, the fruit swelled, and was eaten at table. (*Ibid.* 253.)

Such testimony as this is unimpeachable as far as it can possibly be carried; which is no more than this, cucumbers unimpregnated have been known to attain a good size and perfection. But it by no means refutes the opinion, that, to be most certain of a fruit not falling immaturally, one condition is that it should be impregnated. To secure impregnation, as soon as a female blossom, which is known by having fruit beneath the flower-cup, opens, or on the second morning at farthest, a fresh full expanded male flower is to be plucked, with its footstalk pertaining to it, and the corolla or flower-cup being removed, the remaining central part or anther applied to the stigma of the female, which is similarly situated, and the fecundating dust discharged by gently twirling it between the finger and thumb. Fresh male blossom should be employed for every impregnation, and the operation performed in the early part of the day. An attention to this is only requisite to such plants as are in frames; those grown in the open air are al-

ways sufficiently impregnated by bees and other insects. When the male flowers appear in clusters they may be thinned moderately; but it is almost needless to deprecate the erroneous practice sometimes recommended of plucking them off entirely.

For the production of seed, some fruit must be left of the earliest forced production, as this is found to vegetate and produce fruit in much less time than that raised under hand-glasses, from whence the seed for the open-ground crops is usually obtained. The fruit that is left to produce seed should grow near the root, and upon the main stem, not more than one being left on a plant. They must remain as long as the seed can obtain any nourishment from the plant, which it does whilst the footstalk remains green; when this withers, and the rind of the cucumber has attained its full yellow hue, they may be gathered and reared in the sun until they begin to decay. The seed then being scraped out into a vessel, allowed to remain for eight or ten days, and frequently stirred, until the pulp attached to it is decayed, may be cleansed by frequent agitation in water; the refuse rises to the top, and passes away with the supernatant liquid. Being thoroughly dried by exposure to the air for three or four days, it is then fit for storing.

On this point, Mr. Duncan justly observes, that the finest specimens should be chosen to seed; those only which manifest a disposition to lengthen rapidly,

and throughout alike and simultaneously ; for those fruits which grow first by the footstalk seldom seed, and those at the apex seldom fail. When the fecundation of the stigma, by impregnation, takes place freely, the seed in embryo enlarges directly, consequently the fruit ; and if the living principal becomes diffused generally into a great number of seed, it will grow equal ; if less generally diffused, at the apex most, and *vice versa*. They should always be allowed to become well-ripened previous to being cut, and the seed never extracted until the latest desirable period before sowing. (*Duncan's Cult. of Cucumber*, 86.)

DISEASES.

Mildew. There are many species of parasitical fungi, of which the mycelium, or spawn, pervades all nature, and is only waiting for the occurrence of favourable circumstances to vegetate and afflict the plants which are their peculiar pasturage. An atmosphere too moist, and a temperature somewhat too depressed, for the healthful vegetation of the plants on which those fungi prey, are contingencies especially favourable to the advance of these microscopic ravagers. This is a wise provision, for it is only the distempered juices of plants which are their food. No one ever saw the mildew upon the leaves

of a healthy vigorous cucumber plant. So soon as it does appear, it is a signal for the gardener to increase the temperature, and diminish the moisture of the air in which the plants are growing, but to keep the roots duly supplied with water, and even a little liquid manure will do good. The juices of the plant have become too watery, and its vegetating energy diminished, therefore, let the free admission of light be facilitated by cleaning the glass, and accommodating the angle at which the frame is placed, so as to admit the greatest amount of solar rays. Remove any leaves that are most diseased, especially if others, by the removal, are exposed more freely to the light; dust the whole with flour of sulphur, sprinkle caustic slaked lime over the surface of the bed, and water, once a-week, moderately, with a solution of common salt, 2 ozs. to the gallon.

The Rev. Mr. J. Berkeley informs me, that the species of fungi most commonly occurring on the cucumber, are *Nichothecium roseum* (which really is a species of *Dactylium*), *Oidium erysipoides*, and *O. leuconium*, both of which, Mr. Berkeley believes to be species of the genus *Erysiphe*.

Barrenness arises from the absence of female flowers when the plants do not produce fruit, and from the absence of pollen if fruit but not seeds are borne. Upon these defects the following observations from the pen of Dr. Lindley afford very satisfactory infor-

mation. The late Mr. A. Knight, who was never guilty of forming an opinion upon any other than what he considered conclusive evidence, used to maintain that when plants have the stamens in one flower, and the pistil in another, it is possible to compel such plants to yield one or the other of such flowers at the pleasure of the operator. He found, in fact, by experiment, that the effect upon such plants of a preternaturally high temperature, was to cause them to produce male flowers only ; while a preternaturally low temperature was favourable to the production of female flowers only. A water-melon plant was grown in a house, the heat of which was sometimes raised to 110 deg. during the middle of warm and bright days, and which generally varied in such days from 90 to 105 deg., declining during the evening to about 80 deg., and to 70 deg. in the night ; the air was kept damp by copious sprinkling with water of nearly the temperature of the external air, and little ventilation was allowed. The plant under these circumstances grew with great health and luxuriance, and afforded a most abundant blossom, but all its flowers were male. This result, he says, did not in any degree surprise him ; for he had many years previously succeeded, by long continued very low temperature, in making cucumber plants produce female flowers only ; and he entertained little doubt that the same fruit-stalks might be made, in this and the preceding species, to support either male or female flowers,

“ in obedience to external causes.” This singular circumstance is explicable upon Morphological principles, and does not seem to be touched by any others. When the cucumber plant is ready to blossom, a part of the nascent leaves of some of the buds destined to become flowers will, under ordinary circumstances, form pollen in their cells, and become anthers, the central body being then destroyed by the operation ; while in other buds whose leaves form no pollen in their cells, the organising power is directed to the development of the central body, which then becomes a young fruit, bearing the rudiments of seeds. In that case which is the common and natural state of things each kind of flower assumes its habitual condition. But let the balance of organising forces lose its equipoise, so arrange things, that of the powers which mould the foliage while in its plastic condition, some one or other shall acquire an undue preponderance, as is most especially likely to happen to plants growing in an artificial climate, and the usual structure of the flower will be interfered with. It would seem that in the order of cucurbits, or at least in some of them, the power to form pollen in the cells of the plastic leaves is increased by heat ; and, that being so, to raise the temperature unduly, will have the effect of forming male flowers instead of females ; on the contrary, cold seems to interfere with the formation of pollen, and in that case a low temperature must pro-

duce females in preference to males. In what precise way a high temperature acts upon the cucumber, we cannot judge. We see the effects, but we cannot perceive the immediate operation of the cause. It is, however, notorious that there is something at work in nature which does influence the fashioning of leaves into stamens or carpels; and there is reason to believe that the former are often the result of increased vigour. Thus, in the hemp plant, the males may be known from the females by their larger size, and greater strength; and Fir trees will bear cones in the feebleness of youth, but not their clusters of stamens, till the tree is in the prime of its age. And it may very well be, that in the case of the cucumber the application of unwonted heat may have, and probably does have, the effect of so increasing the vital force, as to throw into the nascent leaves of the flower buds that quality which results in the development within their cells of the highly organised material called pollen. (*Gard. Chron.* 1845. 415)

Canker, like the spot in pelargoniums, is a peculiar ulceration, and having these characters. The plants usually grow very freely for some time, without any perceptible disease, or at the worst, looking rather yellow. By the time that any fruit is set, the leaves become spotted, the spots increase in number and size; the mid-ribs of the leaves are often nearly or quite severed in two wherever the disease touches;

next, the leafstalks, and then the vine itself, together with the fruit, suffer ; on a shoot, a foot in length, eight or ten small specks will often appear, looking as if some corrosive acid had been dropped on the parts in small quantities. These gradually spread. The occasion of the disease appears to be some sudden check to the supply of sap, after the plants have been brought to a high state of vigour and enlarged development of foliage. A decline in the temperature, or deficiency in the supply of water, render that development of foliage unnecessary, and from that moment its decay commences. I have known the canker at once banished by an increase of temperature, and an additional supply of water. It has been recommended, also, to impregnate the air of the frame with the fumes of sulphur, but I have no faith in applications of this, or any kind, to the parts diseased. Where the fumes of sulphur have been supposed to be beneficial, the benefit probably arose from the increased heat employed to obtain the fumigation.

Gumming is an exudation of gummy matter, which sometimes rises through the skin of the fruit. It appears to be an instance of extravasated sap arising from its being in excess, and will probably disappear by diminishing the supply of water slightly.

Bitterness is an ill quality of the fruit that may be removed by an increase of temperature and a freer exposure to the light. It arises from the imperfect

elaboration of the juices ; those in the neck of the cucumber, being least digested, are always more bitter than in any other part of the fruit.

Deformity of the fruit arises commonly from want of equable elaboration of the sap in all its parts. A crooked cucumber is usually most pale on the exterior side of the curvature, evincing that this side was least exposed to the light. A similar defect is produced by sudden changes of temperature ; whether of that in which the foliage or the root is vegetating. Deformity particularly prevails if the plants be freely watered in dull or cold weather ; it also often occurs when a few cold or wet days succeed very warm ones in the early part of the summer, and the heat of the bed has become exhausted ; not unfrequently the bad effects may be observed for some time after the check, or rather the chill, has happened. Keeping plants warm and vigorous, and from sudden checks, is the best preventive ; but insufficient light or water, and improper soil, cause deformity in the early part of the year. (*Ibid.* 1842. 97.)

INSECTS.

Green Fly (*Aphis cucumeris*) very rarely appears, and never, I think, unless the plants have been very ill-cultivated. Syringing with tobacco-water destroys it.

Thrips. To kill these, syringe with tobacco-water, mixing that with a little sulphur, or a decoction of elder leaves. This, repeated a few times, will suffice. Another method is, to dust the infected parts with the flowers of sulphur, and in three or four days to wash it off with a syringe.

Red Spider (*Acarus tellarius*) will never appear if the soil and air have been kept properly moist. If it attacks the plants, fumigate them with sulphur, and increase the moisture.



